The Relation between Parent Involvement and the Development of Kindergarten Self-Regulation and Literacy Skills

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Dedication

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Abstract

Since the turn of this century, improving school readiness for young children has been a central tenet of research, practice, and public policy at the local, state, and national levels (Blair, 2002; Boethel, 2004; Hair, Halle, Terry-Humen, Lavelle, & Calkins, 2006; Konald & Pianta, 2005; Nores, Belfled, Barnett, & Schweinhart, 2005; Rolnick & Grunewald, 2003; Shonkoff & Phillips, 2000; Snow, 2006; Zigler & Hall, 2000). At the same time, the academic and behavioral expectations for young children in kindergarten have skyrocketed (Bassok & Latham, 2017). Thus, it comes as no surprise that a plethora of early childhood programs supporting the development of behavioral self-regulation are currently under development and evaluation (e.g., Bierman et al., 2008; Bodrova & Leong, 2007; Raver et al., 2008). The most promising of these programs target social and emotional competence, classroom quality, and parent scaffolding support for learning.

Yet, very little is known about self-regulation development after the transition to formal schooling or how to promote growth in academic-focused kindergarten programs. The present study explores relations between parent involvement, one potential method, and growth in literacy and self-regulation skills. Thirty-seven kindergarten children were recruited from six classrooms in a rural consolidated school district. Direct assessments of literacy skills and self-regulation skills were collected in the fall and spring. Teachers reported on children's self-regulated learning behavior in the winter. Parents reported on their involvement in education as well as several demographic characteristics.

Multiple linear regression analyses were used to examine the relation between parent involvement and growth in literacy and self-regulation skills after controlling for relevant demographic variables and school readiness skills. Results indicated that parent

involvement was not a significant predictor of either spring outcome. In addition, self-regulated learning was not significantly associated with spring literacy or self-regulation skills and could not be explored as a potential mediator. Instead, school readiness skills remained the most robust predictors of success in kindergarten. Implications for future research are discussed.

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Chapter 1

Introduction

Traditionally, kindergarten has been viewed as a setting in which young children can adjust gradually to the demands and expectations of formal schooling. Yet, thanks to increasing accountability in education and a greater push toward high-stakes testing, the academic rigor of kindergarten is likewise heightened (Kagan & Kauerz, 2007; Lynch, 2015; Meisels, 2007; Pianta, 2007; Pyle & Bigelow, 2015; Pyle & DeLuca, 2013; Ray & Smith, 2010). For example, Parker and Neuharth-Pritchett (2006) conducted interviews with 34 kindergarten teachers, all of whom reported seeing a shift from child-centered social play activities toward teacher-directed structured learning activities. More recently, an analysis of data from the Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K) showed that the percentage of kindergarten teachers nationally who believe that children should be able to read by the end of kindergarten more than doubled from 1998 to 2010 (Bassok, Latham, & Rorem, 2016). Further, the study revealed that children who were enrolled in kindergarten in 2010 spent significantly more time using textbooks and worksheets, taking standardized tests, and participating in direct reading and math instruction than did children who were enrolled in kindergarten just twelve years prior. These noticeable changes in the nature of kindergarten programs have caused researchers, practitioners, and policy makers to question what it means for young children to be ready for school.

Although there has been considerable discussion in the field regarding a definition for some time now, school readiness may best be conceptualized as a multidimensional set of competencies, skills, and characteristics that enables children to adjust to, engage

in, and benefit from the routine and curriculum of formal schooling (Hays & McConnell, 2009). For example, emergent language and literacy development has long been linked to later academic achievement (Hart & Risley, 1995; Sénéchal, LeFèvre, Smith-Chant, & Colton, 2001; Storch & Whitehurst, 2002; Whitehurst & Lonigan, 1998), indicating that children are able to build upon what they already know and can do from the very first day of school. This line of research has resulted in program and policy development targeting early vocabulary, alphabet knowledge, and phonemic awareness in preschool at the local, state, and national levels. Interestingly, though, another recent analysis of ECLS-K data indicated that kindergarten children in 2010 were rated higher on measures of academic competence but lower on measures of behavioral competence by their teachers than were kindergarten children in 1998 (Bassok & Lathom, 2017). This suggests that building a solid foundation of early academic skills is necessary but not entirely sufficient for young children to be successful in school, at least from the perspective of kindergarten teachers. Incoming learners must also be ready to follow classroom directions, rules, and routines, to form positive relationships with their teachers and peers, to approach new and difficult activities willingly, to work cooperatively in group settings, and to handle redirection and corrective feedback appropriately. These tasks have a key developmental competence in common: behavioral self-regulation.

It is no coincidence, then, that the body of research on behavioral self-regulation has grown exponentially since the turn of the century. Behavioral self-regulation is now thought to play a central role in shaping academic and behavioral readiness for school (Allan, Hume, Allan, Farrington, & Lonigan, 2014; Blair, 2016; Blair, McKinnon, & the FLP Investigators, 2016; Duckworth & Carlson, 2013; Duncan, McClelland, & Acock,

2017; Graziano, Garb, Ros, Hart, & Garcia, 2016; Lonigan et al., 2017; Nelson et al., 2017; Portilla, Ballard, Adler, Boyce, & Obradović, 2014; Sasser, Bierman, & Heinrichs, 2015; Stipek & Valentino, 2015; Vernon-Feagans, Willoughby, Garrett-Peters, & the FLP Investigators, 2016). Behavioral self-regulation is an umbrella term that refers to a dynamic system in which cognitive and emotional facets must work in concert with one another to direct a child's overt behavior toward a superordinate goal, whether academic or behavioral in nature (Spiegel, Lonigan, & Phillips, 2017; Willoughby, Blair, & the FLP Investigators, 2015). For example, cognitive regulatory processes help children to ignore distractions and focus their attention during instruction, allowing them to gain the early academic skills that are related to subsequent achievement. In the same way, emotional regulatory processes help children to manage extreme feelings of anxiety or anger, allowing them to behave in more socially acceptable ways by maintaining appropriate interactions with teachers and peers. As such, self-regulation would appear to be an ideal target for intervention during the preschool years if it truly has the power to boost long-term academic and behavioral outcomes for young children, especially those who enter school with limited background knowledge and experiences (Blair & Raver, 2012a; Bierman et al., 2014; Konald & Pianta, 2005).

Indeed, multiple disciplines including child development, cognitive neuroscience, educational psychology, and prevention science have investigated the contribution of self-regulation to school readiness and resiliency from adversity, pointing toward its key influence on the early school experience of young children. Moreover, a collection of intervention studies is beginning to accumulate, demonstrating that self-regulation can be improved in a number of ways including direct training of cognitive regulatory processes

(Barnett et al., 2008; Blakey & Carroll, 2015; Blair & Raver, 2014; Diamond, Barnett, Thomas, & Munro, 2007; Fernandez-Molina, Trella, & Barros, 2015; Röthlisberger, Neuenschwander, Cimeli, Michel, & Roebers, 2012; Rueda, Checa, & Combita, 2012; Schmitt, McClelland, Tominey, & Acock, 2015; Tominey & McClelland, 2011), direct instruction in social problem-solving strategies and therapeutic coping skills (Bierman et al., 2008, 2014; Bierman, Nix, Greenberg, Blair, & Domitrovich, 2008; Flook, Goldberg, Pinger, & Davidson, 2014; Graziano, Slavec, Hart, Garcia, & Pelham, 2014; Humphrey et al., 2016; Pears et al., 2013, 2014; Pears, Kim, Healey, Yoerger, & Fisher, 2015; Razza, Bergen-Cico, & Raymond, 2015; Tucker, Schieffer, Wills, Hull, & Murphy, 2017; Upshur, Heyman, & Wenz-Gross, 2017; Webster-Stratton, Reid, & Stoolmiller, 2008), enhanced emotional support and classroom management in early childhood settings (Domitrovich et al., 2009; Merz, Landry, Johnson, Williams, & Jung, 2016; Raver et al., 2008, 2009, 2011; Jones, Bub, & Raver, 2013), and improved parent support for learning within the home environment (Chang, Shaw, Dishion, Gardner, & Wilson, 2014; Chang, Shaw, Shelleby, Dishion, & Wilson, 2017; Graziano & Hart, 2016; Lunkenheimer et al., 2008).

These studies, discussed in greater detail in the next chapter, have demonstrated that self-regulation is amenable to intervention during the preschool years. Furthermore, in some cases, intervention effects on self-regulation development have been linked to meaningful improvements in academic and behavioral outcomes following the transition to kindergarten, especially among children who are placed at-risk for school failure. Yet, very little is known currently about the ways in which kindergarten programs may further hone self-regulation. It may be that the window of opportunity for targeting these skills

has closed by the time young children enter school, leaving those who do not participate in early intervention programs at a significant disadvantage.

To date, only one intervention study is known to target the development of self-regulation in kindergarten to promote academic achievement in subsequent grades (Blair & Raver, 2014). In the large-scale randomized field trial, 759 kindergarten children were assigned to treatment and control classrooms. Treatment classrooms implemented Tools of the Mind (Bodrova & Leong, 2007), which supplements reading, math, and science instruction with child-directed dramatic play to scaffold cognitive self-regulation skills. Control classrooms were business-as-usual, primarily using teacher-directed instruction in content areas. Results indicated that children in treatment classrooms outperformed children in control classrooms on measures of self-regulation and academic achievement in the spring of kindergarten and in the fall of first grade. These effects were particularly evident for children who were enrolled in high-poverty schools, indicating that at-risk kindergarten children are likely to be better prepared for subsequent grades when allowed opportunities for child-directed social play as opposed to only teacher-directed structured learning activities. These results are particularly interesting in light of the previously discussed changes observed in kindergarten programs over the last two decades.

The Blair and Raver (2014) study offers preliminary evidence that (a) behavioral self-regulation continues to be malleable following the transition to school and (b) growth in self-regulation across the kindergarten year is associated with higher academic skills in later years. Nonetheless, it is not yet clear how self-regulation may be targeted effectively in a teacher-directed, academically-focused kindergarten program. If teachers are feeling greater pressure to devote the majority of the school day to reading and math instruction

(Parker & Neuharth-Pritchett, 2006), they may not be willing to supplement the existing curriculum with strategies that have proven successful in preschool settings. Thus, it may be prudent to further explore the role of parent support for learning as children transition to formal K-12 education. Indeed, there is a substantial body of literature linking parent involvement in education to academic success (see Castro et al., 2015 for a review). It is possible that parent involvement improves academic achievement by strengthening self-regulation skills. If this is true, any effort to augment parent involvement in kindergarten would be potential means to promote school success, especially at-risk populations.

The present study will investigate three aspects of parent involvement that could be related to growth in both self-regulation skills and academic skills in kindergarten: the quality of the home learning environment, parent involvement in activities at school, and the quality of the parent-teacher relationship. Specifically, the study will answer the following research questions:

1. To what extent are three facets of parent involvement related to growth in literacy skills in kindergarten? It is expected that the home learning environment, school-based involvement, and the parent-teacher relationship will be positively related to growth in literacy skills because (a) parents may teach reading skills explicitly in the home learning environment, (b) parents who are active at school may send messages to children that reading is important, and (c) parents who communicate more regularly with teachers may approach reading instruction in the same way.
2. To what extent do three facets of parent involvement contribute to growth in literacy skills in kindergarten indirectly by operating through self-regulated learning behaviors (i.e., attention and persistence) in the classroom? It is expected

that the home learning environment, school-based involvement, and parent-teacher relationship will be positively related to growth in literacy skills because (a) parents may reinforce positive behaviors in the home learning environment that are then transferred to the school environment, (b) children may behave more appropriately in the classroom if parents are likely to show up and catch them in the act, and (c) parents and teachers who communicate more frequently may work together to teach and reinforce positive behavior in the same way. Furthermore, children who display attention and persistence during learning activities in the classroom are then better equipped to benefit from reading instruction, thereby increasing literacy skills.

3. To what extent do three facets of parent involvement contribute to the continued development of self-regulation skills in kindergarten indirectly by operating through self-regulated learning behaviors in the classroom? It is expected that parent involvement will positively impact growth in self-regulation because children who practice demonstrating attention and persistence in the classroom strengthen their overall capacity for self-regulation.

Chapter 2

Literature Review

Given the widespread interest in behavioral self-regulation across many fields of study, it is somewhat surprising that there is a lack of consensus regarding a definition of the construct. Although earlier conceptualizations of self-regulation included emotional and cognitive components that direct overt behavior (Blair, 2002; Denham, 2006; Liebermann, Giesbrecht, & Muller, 2007; Masten & Coatsworth, 1998; Posner, Rothbart, Sheese, & Tang, 2007; Raver, Garner, & Smith-Donald, 2007; Shonkoff & Phillips, 2000), more recent perspectives seem to pay greater attention to cognitive regulatory processes and emphasize, in particular, children's ability to modulate attention in service of learning and problem-solving (Duckworth & Carlson, 2013; Liew, 2012; McClelland & Cameron, 2012; Zhou, Chen, & Main, 2012). This slight shift in focus has dramatic implications for how self-regulation is operationalized in research, which could then affect predictive relations with key outcomes, advancement in assessment methodologies, and innovation in intervention strategies. For example, those researchers who view attention as critical to school success have contributed to a wealth of intervention studies on direct training of cognitive regulatory processes (Barnett et al., 2008; Blakey & Carroll, 2015; Diamond et al., 2007; Fernandez-Molina et al., 2015; Röthlisberger et al., 2012; Rueda et al., 2012; Schmitt et al., 2015; Tominey & McClelland, 2011).

Unfortunately, many of these interventions have not yet demonstrated meaningful improvements in academic and behavioral outcomes for children in treatment conditions compared to children in control conditions (Blair, 2017; Diamond & Ling, 2015; Walcott

& Phillips, 2013). One potential explanation for these disappointing findings is a too-narrow operational definition of self-regulation.

As such, there may be some merit in considering, again, the role that emotion-related skills may play in school readiness, academic achievement, and resilience from adversity. Indeed, there is a small body of literature that provides some evidence for a mediational relationship among emotional and cognitive self-regulatory components and subsequent outcomes (i.e., Graziano, Reavis, Keane, & Calkins, 2007; Howse, Calkins, Anastopoulos, Keane, & Shelton, 2003; Rhoades, Warren, Domitrovich, & Greenberg, 2011). If self-regulation development truly follows this path, early childhood programs should incorporate components that are designed to strengthen both emotion and cognition (Blair & Raver, 2014). This may be especially important for programs serving young children from low-income or otherwise disadvantaged households, as these children are at greater risk for poor emotion-related skills (Denham et al., 2012).

This chapter will provide an overview of current research on the integration of emotional and cognitive components of self-regulation, emphasizing predictive relations with key developmental outcomes. In addition, this chapter will propose an intervention model for early childhood settings that integrates current advances in the enhancement of both emotion and cognitive self-regulation to improve children's adjustment to school and to augment academic and social outcomes.

Self-Regulation of Emotion

Emotion regulation involves the physiological experience, cognitive modulation, and behavioral expression of emotions (Denham, 2006; Ferrier, Bassett, & Denham, 2014; Hill, Degnan, Calkins, & Keane, 2006). The preschool years mark a period of

dramatic growth in these skills (Carlson & Wang, 2007; Liebermann et al., 2007; Saarni, 1984), and this growth appears to be necessary for the subsequent transition to formal schooling. In a small study of 49 low-income preschoolers, emotion regulation emerged as a protective factor, allowing children who could self-soothe and redirect themselves to form close relationships with their teachers; these children were then rated as better adjusted to school (i.e., showed more academic readiness skills and self-regulated learning behaviors) than children with poor emotion regulation (Shields et al., 2001). In turn, emotion regulation in kindergarten was associated with multiple measures of early academic skills even after controlling for the quality of the student-teacher relationship among a larger sample of 325 children (Graziano et al., 2007). As such, early emotion regulation may contribute to academic success in two ways: (a) by influencing children's ability to form positive relationships with their teachers who then motivate and encourage further learning, and (b) by enabling the cognitive self-regulatory system to work effectively so that children can take advantage of instructional opportunities available in the classroom (Blair, 2002, 2008).

Self-Regulation of Cognition

Cognitive regulation (i.e., executive function) includes the central organizing processes of attention shifting, working memory, and inhibitory control that allow for the planning and execution of goal-directed behavior (Garon, Bryson, & Smith, 2008; Liew, 2012; McClelland & Cameron, 2012; Zhou et al., 2012). Cognitive regulation seems to be related to, but largely independent of, general intelligence and temperament (Hongwanishkul, Happaney, Lee, & Zelazo, 2005), and it develops rapidly and markedly

throughout the early childhood years (Carlson & Wang, 2007; Espy, Kaufmann, Glisky, & McDiarmid, 2001; Liebermann et al., 2007).

One recent meta-analysis of 75 published studies obtained a modest correlation between inhibitory control and academic achievement in either preschool or kindergarten, indicating that children who are able to refrain from impulsive responding are likewise better equipped to gain early reading and math skills than children who are not (Allan et al., 2014). For example, inhibitory control may be important for remembering to apply a phonetic rule (e.g., the "bossy e" makes the vowel say its name) when sounding out an unfamiliar word instead of displaying the prepotent response (e.g., using the short vowel sound). However, as reading becomes more automatic, inhibitory control may become less important. Supporting this idea, Stipek and Valentino (2015) examined longitudinal data that related both working memory and attention in preschool to academic growth trajectories through adolescence. Their analyses seem to support a "fade-out" hypothesis in which cognitive regulation was strongly and positively correlated to academic skills during the first few years of school, but it was not associated with academic skills in late elementary or middle school.

One explanation for this finding is that working memory and attention may allow young children to master the basic reading and math skills that are then built upon in later grades. Alternatively, cognitive regulatory processes may enable children to experience success in early elementary school, motivating them to continue achieving at high levels in subsequent years. Indeed, a study of 338 kindergarten children identified quality in the teacher-child relationship as well as children's approaches to learning as mediators of the relationship between cognitive regulation skills in the fall and early academic skills in the

spring (Portilla et al., 2014). Thus, cognitive self-regulation appears to contribute to later academic achievement in two ways: (a) by helping children attend to instruction, practice skills, and recognize opportunities for generalizing skills, and (b) by instilling in children a love of learning and motivating them to continue to succeed.

Integrating Emotional and Cognitive Regulatory Systems

Given such strong, albeit correlational, evidence pointing toward the importance of cognitive regulation in preschool, some researchers have virtually ignored the impact of emotion-related skills and have tended to focus exclusively on better understanding and enhancing cognitive skills, particularly attention. Yet, there is evidence that emotion regulation indirectly influences academic achievement by operating through cognitive regulation. A longitudinal study of 122 children showed that parent ratings of emotion regulation in preschool predicted teacher ratings of executive function as well as direct assessments of early literacy skills at the end of kindergarten (Howse et al., 2003). Further, when kindergarten teacher ratings of children's ability to flexibly shift attention, to use working memory, and to control impulses the classroom were entered into the model, the correlation between emotion regulation in preschool and literacy skills at the end of kindergarten became non-significant. Similarly, a larger study of 341 low-income children demonstrated that emotion regulation skills in preschool predicted academic competence in first grade, and 98% of this correlation was mediated by attention-related skills in kindergarten (Rhoades et al., 2011).

Both studies lend support to the notion that preschoolers who can effectively regulate their emotions are better able to control their attention and behavior during instruction in order to gain necessary academic skills. That is, emotion regulation seems

to exert a bottom-up influence on the cognitive self-regulatory system, either enabling or hindering its ability to plan and execute goal-directed behavior. Therefore, it stands to reason that children entering kindergarten without sufficient emotion regulation, as is commonly found in disadvantaged populations, are more likely to display poor classroom learning behaviors as well as poor academic achievement. This idea has significant direct implications for intervention development and evaluation.

Targeting Cognitive Regulation in Early Childhood

The growing body of information on the importance of self-regulation at school entry has led to the development of several interventions targeting cognitive regulation skills among young children. Some of these interventions involve explicit instruction and rote practice of attention shifting, working memory, and inhibitory control skills within computerized games (Blakey & Carroll, 2015; Fernandez-Molina et al., 2015; Röthlisberger et al., 2012; Rueda et al., 2012). Small efficacy trials generally support the premise that direct training can improve children's performance on executive function tasks, even during the preschool years, but there is no evidence to date that these gains are transferred to children's observed behavior in the classroom or to children's assessed reading and math skills (Diamond & Ling, 2015; Walcott & Phillips, 2013). Perhaps early childhood programs that address preschoolers' use of cognitive regulation in everyday contexts would better promote meaningful improvements in the outcomes of interest (Blair, 2017).

An example of an intervention that takes advantage of opportunities to teach cognitive regulation in everyday contexts involves simple playground games (Schmitt et al., 2015; Tominey & McClelland, 2011). In one randomized field trial, 65 preschool

children were assigned to treatment and control groups (Tominey & McClelland, 2011). Treatment consisted of 16 play sessions during which children participated in games that require the use of attention shifting, working memory, and inhibitory control (e.g., Simon Says, Red Light/Green Light, etc.). Although no intervention effect was found in the overall sample, post-hoc analyses revealed a modest intervention effect among children who scored lowest on a measure of executive function at pre-test. A larger follow-up trial with 276 preschool children found an intervention effect on executive function for the overall sample (Schmitt et al., 2015). However, no main effects were found on children's classroom learning behaviors or academic skills. That is, the proximal gains did not result in meaningful differences in behavioral or academic outcomes.

To date, the best information on the effectiveness of direct training programs on improving behavior in the preschool classroom is provided by randomized field trials of Tools of the Mind (Bodrova & Leong, 2007), which draws from the learning theories of Lev Vygotsky. The preschool version of the curriculum combines child-directed dramatic play and teacher scaffolding to encourage inhibitory control, working memory, and attention shifting skills throughout the school day. A study of 147 four- and five-year-old preschoolers showed that children who were assigned to Tools of the Mind classrooms outperformed children who were assigned to business-as-usual control classrooms on computerized measures of executive function at the end of the year (Diamond et al., 2007). A follow-up study with 274 three- and four-year-old preschoolers found a moderate intervention effect for teacher-rated social skills as well. That is, gains made by practicing cognitive self-regulatory skills during play were then transferred to observed behavior in the classroom; however, improvements in language and academic outcomes

became non-significant once changes in observed classroom quality were accounted for in hierarchical analyses (Barnett et al., 2008). Thus, the Tools of the Mind curriculum appears to be successful because it either encourages teachers to engage with children in a more emotionally supportive way or it helps teachers to create productive classrooms that run smoothly. The rote drill of self-regulation skills may not be the mechanism for change.

Despite some positive findings in these initial studies, the results of three recent large-scale randomized trials of the Tools of the Mind curriculum are discouraging and show little to no benefit over other preschool curricula on children's self-regulatory, social-emotional, or academic competence by the end of preschool (Clements, Sarama, Unlu, & Layzer, 2012; Lonigan & Phillips, 2012; Wilson & Farran, 2012) or by the end of kindergarten (Farran, Wilson, Lipsey, & Turner, 2013). Therefore, it may be that the preschool years are not the optimal time to promote cognitive and attention-related skills exclusively, particularly among at-risk children who are more likely to have delays in social-emotional development.

To this end, a study of 759 older children demonstrated that the kindergarten version of the Tools of the Mind curriculum improved cognitive self-regulation as well as academic achievement at the end of kindergarten, and these effects were sustained at the end of first grade (Blair & Raver, 2014). Taken together, these results suggest that some degree of competence with emotion regulation is a prerequisite for a cognitive regulation curriculum like Tools of the Mind to be successful. Hence, early childhood programs, especially those serving preschoolers who are at-risk for difficulties with self-regulation, should also include strategies to enhance emotion-related skills in order to best promote

school success (Evans & Rosenbaum, 2008). The following section discusses three promising elements that could be integrated into a comprehensive program for children placed at-risk: curricular enrichment, classroom quality, and parent involvement.

Targeting Emotion and Cognitive Regulation in Early Childhood

Curricular enrichment. A number of studies have investigated the utility of supplementing the curriculum with instruction in social-problem solving and therapeutic coping skills for boosting self-regulatory processes in preschool (Graziano & Hart, 2016; Graziano et al., 2014; Humphrey et al., 2016; Pears et al., 2013, 2014, 2015; Tucker et al., 2017; Upshur et al., 2017; Webster-Stratton et al., 2008). For example, there has been increasing interest within the last several years in the effects of mindfulness, in which children are trained to reflect on their personal experiences, noticing and modifying their emotional responses to their thoughts as needed (Zalazo & Lyons, 2012). In a small quasi-experimental study, 18 preschool children who engaged in breathing and yoga exercises throughout the school day outperformed 16 comparable preschool children on behavioral measures of inhibitory control and focused attention (Razza et al., 2015); however, no intervention effect was found on an indirect measure of self-regulation completed by parents, suggesting that strategies learned in the intervention were not then generalized to the home environment. In addition, teacher-reported measures were not included in the study, so whether the intervention improved children's self-regulated learning behaviors in the classroom is not known.

Yet, mindfulness programs do appear to enhance children's prosocial behaviors in the classroom. In a randomized study of a 12-week kindness curriculum, 30 preschoolers in intervention classrooms showed larger gains in teacher-reported social competence and

observed willingness to share treats than 38 preschoolers in control classrooms (Flook et al., 2014). Although the results of these studies are promising, much more work is needed using (a) experimental designs, (b) larger samples of children, particularly those who are at-risk for difficulties with self-regulation, (c) multiple measures of self-regulation skills including physiological, behavioral, and other-reported methods, and (d) a sizeable set of relevant control variables such as child and family risk factors, teacher experience, and classroom quality. These advances would increase our confidence in the effectiveness of mindfulness on self-regulation in preschool.

The most convincing evidence supporting the implementation of social problem-solving instruction in preschool has been provided by a large-scale randomized field trial of The Research-based Developmentally Informed (REDI) Program, which supplements the existing Head Start curriculum with interactive book-reading activities, letter and sound games, and a well-established social problem-solving curriculum (Bierman et al., 2008). In the study, four-year-old low-income children in treatment classrooms showed modest gains over comparable children in control classrooms on a direct assessment of attention shifting and inhibitory control as well as examiner-rated self-regulation during the direct assessments (Bierman, Nix et al., 2008). Further, the intervention effect on these variables accounted for one-third of the intervention effect on early language and literacy skills, social competence, and aggressive behavior by the end of the year. In addition, a follow-up study during the kindergarten year showed sustained intervention effects for all of these outcomes except expressive vocabulary (Bierman et al., 2014). This suggests that supplementing preschool curricula with activities to strengthen social-

emotional skills does yield improvements in children's executive function and self-regulated learning behaviors that allow for gains in academic skills.

Although these results are promising, the REDI Program also incorporated an intensive teacher training and mentoring component, resulting in modest improvements in classroom climate, classroom management, and teachers' use of complex language throughout the school day (Domitrovich et al., 2009). Like the evaluations of Tools of the Mind discussed earlier, it is not clear from the study whether children's gains were due to the changes in curriculum or classroom environments. Therefore, interventions that target the global quality of early childhood classrooms are needed, especially in impoverished neighborhoods where it may be particularly difficult to recruit and retain highly qualified and effective preschool teachers and where observed classroom quality is generally low (Pianta, La Paro, Payne, Cox, & Bradley, 2002).

Classroom quality. Both quality in classroom instruction and a positive teacher-child relationship have been shown to enhance young children's academic achievement (Burchinal et al., 2008; Graziano et al., 2016; Maier, Vitiello, & Greenfield, 2012; Ponitz, Rimm-Kaufman, Grimm, & Curby, 2009; Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009). For instance, a study of 532 preschool children showed that growth in early math skills was predicted by observed instructional quality (Anders et al., 2012). Further, those children who had been enrolled in high quality classrooms for the longest period of time showed the greatest growth in early math skills throughout the year. It is plausible that classrooms characterized by high quality instruction offer multiple opportunities for children to engage in learning activities, while emotionally supportive classroom teachers encourage children to maintain focus and persist with difficult tasks (Fuhs, Farran, &

Nesbitt, 2013). Indeed, a study of 1,268 kindergarten children demonstrated that teacher ratings of children's self-regulated learning behavior mediated the relation between the observed quality of instructional support and children's math skills (Pakarinen et al., 2011). Another study of 1,292 children showed that executive function in preschool and teacher-child relationship quality in kindergarten were unique moderators of the relation between preschool math skills and kindergarten math skills (Blair et al., 2016). That is, children made greater gains in math from preschool to kindergarten if they had higher executive function skills and more positive relationships with their kindergarten teachers. Although studies like these are compelling, the causal mechanisms at work are still not clear. For example, it may be that children with high levels of self-regulation contribute to classrooms that run smoothly and allow teachers to spend more time delivering instruction, thereby boosting children's academic skills.

However, research on the Chicago School Readiness Project (CSRP) provides strong causal evidence that emotionally supportive, well-managed preschool classrooms promote self-regulation development and subsequent school readiness outcomes among at-risk children (Raver et al., 2008, 2009, 2011; Jones et al., 2013). In a randomized field trial, Head Start teachers completed a training program on classroom management and received on-site coaching from licensed clinical social workers to help them implement strategies with children. Moderate to large intervention effects were observed for positive climate, teacher sensitivity, and behavior management (Raver et al., 2008). In addition, three- and four-year-old low-income children in treatment classrooms showed moderate to large gains over comparable children in control classrooms on several behavioral and academic outcomes such as teacher-rated and observational assessments of internalizing

and externalizing behavior problems (Raver et al., 2009) as well as direct assessments of receptive vocabulary, early literacy, and early math skills (Raver et al., 2011). Further, the CSRP was found to improve children's performance on direct assessments of executive function and a measure of self-regulation during direct assessments (Raver et al., 2011), and gains in these skills were mediated by the intervention effect on observed teacher-child relationship quality (Jones et al., 2013). Finally, self-regulation and teacher-child relationship quality were unique mediators of the intervention effect on school readiness outcomes (Raver et al., 2011). This line of research confirms that teacher- and classroom-level variables can be modified in order to improve teaching, and that these improvements result in meaningful social-emotional and academic gains for young children.

Parent involvement. Although these studies show promising results, the majority of them have been conducted in early childhood education settings. However, preschool children spend much of the day in the home learning environment with parents and other caregivers. Too little is currently known about whether the home learning environment is amenable to intervention and whether improvements in the quality of the home learning environment likewise augment the development of young children's self-regulation skills, resulting in meaningful long-term outcomes that are then transferred to the school setting.

One longitudinal study followed infants from seven months of age and found that improvements in the observed quality of the home learning environment (i.e., cognitive stimulation, emotional support for learning, and positive discipline practices) between each assessment window uniquely predicted self-regulation at 48 months of age (Blair & Raver, 2012b). As such, an increase of one standard deviation in home quality between 7

and 15 months was associated with an increase of 0.14 standard deviations in preschool self-regulation skills. Similar results were found for increases in home quality between 15 and 24 months and between 24 and 36 months. Another longitudinal study followed 82 children from two years of age to four years of age and revealed that parent scaffolding support during problem-solving tasks was associated with greater growth in cognitive self-regulatory skills (Hammond, Müller, Carpendale, Bibok, & Liebermann-Finestone, 2012). Taken together, these results suggest that certain aspects of the home learning environment are important for self-regulation development, but they do not demonstrate that parent supports may be altered through intervention to improve school adjustment.

The best evidence we have so far that parent supports can be improved in order to produce meaningful results for young children comes from a randomized field trial of the Family Check-Up (Chang et al., 2014, 2017; Lunkenheimer et al., 2008). Two-year-old children from 731 low-income families were randomly assigned to treatment and control conditions. Consultants met with parents of children in the intervention group to discuss their concerns about parenting, to coach them on changing problematic practices, and to connect them to resources in the community such as child care, housing, and vocational training. Children in the treatment condition were rated by their mothers as demonstrating significantly higher levels of inhibitory control at age four than children in the control condition. Gains in positive parenting practices such as parent involvement in education and parent scaffolding support during learning activities mediated the intervention effect on child self-regulation development (Lunkenheimer et al., 2008). Furthermore, long-term effects that transferred to the school setting were apparent, as teacher ratings of self-regulated learning behaviors in the classroom at age 7.5 were significantly higher for

children in the treatment condition than for children in the control condition (Chang et al., 2014). The most recent analysis of data from the study showed that the intervention effect on positive parent-child dyadic interactions was related to child self-regulation during the transition to kindergarten, and this in turn was related to greater child acceptance by peers as late as middle childhood (Chang et al., 2017). Thus, it appears that the quality of the home learning environment for young, at-risk children is indeed malleable, that increased positive parent support enhances the development of self-regulation, and that these skills are related to children's behavioral performance at school.

It may be the case that continuing to improve the home learning environment as children transition to kindergarten would drive self-regulation development even further, especially if children are bringing home reading and math work to complete with parents. That is, parents may model and reinforce self-regulated learning behaviors (i.e., attention and persistence) during assignments that enhance children's capacity for self-regulation; however; this possibility has not yet been explored in the extant literature. Additionally, other aspects of parent support such as involvement in school activities and the formation of a positive teacher-parent relationship may also strengthen self-regulation skills over time.

Interestingly, a recent analysis of the 1998 ECLS-K data set did not find a link between the home learning environment and kindergarten academic achievement; however, parent involvement in school activities was a unique predictor for growth in reading and math (Galindo & Sheldon, 2012). Furthermore, a longitudinal study of 2,616 Australian children showed that school-based involvement in first grade was related to self-regulated learning behaviors in first grade, which in turn predicted reading skills in

third grade (Daniel, Wang, & Berthelsen, 2016). Unfortunately, direct assessments of self-regulation skills were not included in either study, each relying on other-reported measures instead. It may be that parents who are involved in the classroom may enforce similar rules and routines at home, thereby enhancing children's self-regulatory capacity. Self-regulation skills may then contribute to children's ability to attend to instructional opportunities in the classroom, persist with difficult tasks, and subsequently gain skills in content areas. As such, research should explore how various facets of parent involvement in education impact the development of children's capacity for self-regulation as well as the promotion of children's self-regulated learning behaviors during the early elementary school years.

Summary

Conceptually, self-regulation includes both emotional and cognitive components that must work in concert with one another to direct behavior toward academic and social goals (Spiegel et al., 2017; Willoughby et al., 2015). However, current advancements in intervention science appear to target early attention-related skills almost exclusively as a means to enhance academic achievement (e.g., Blakey & Carroll, 2015; Fernandez-Molina et al., 2015; Röthlisberger et al., 2012; Rueda et al., 2012). Yet, there is evidence that some degree of competence with emotion regulation is a necessary prerequisite for these interventions to be successful, especially with children from low-income or disadvantaged backgrounds (Blair & Raver, 2014). In light of this information, researchers must be compelled to incorporate components in early childhood programs that are designed to strengthen both emotional and cognitive self-regulatory systems.

This chapter described three elements of early childhood programs that are likely to support the development of self-regulation, particularly among young children placed at-risk for failure at school. First, the preschool curriculum can be enhanced with social problem-solving instruction and therapeutic techniques in order to directly teach young children how to regulate stress, emotion, and cognition in everyday contexts (Bierman et al., 2008; Humphrey et al., 2016; Razza et al., 2015; Tucker et al., 2017; Webster-Stratton et al., 2008). Second, emotional support for learning and classroom management can be improved through training and coaching for preschool teachers and child care providers (Merz et al., 2016; Raver et al., 2008). Third, parent involvement in education and parent scaffolding support during learning tasks can be ameliorated with training and coaching for parents and caregivers (Chang et al., 2017; Lunkenheimer et al., 2008).

A common thread underlying each of these three elements is the importance of dyadic relationships. That is, social problem-solving and therapeutic techniques help children to regulate their emotional responses so that they can engage in positive interactions with others around learning, efforts to improve classroom quality increase positive interactions between teachers and children so that continued learning can occur, and parenting interventions operate through improving parent-child interactions around learning as well as parent-teacher interactions around how to support learning. This emphasis on relationships could explain why the consideration of emotion-related skills as part of self-regulation is key. Therefore, interventions that target children's self-regulatory skills in isolation rather than during authentic interactions with others are not likely to be effective. Instead, integrating curricular enrichment, classroom quality, and parent involvement into a comprehensive program for at-risk children is perhaps our best

bet promoting “ready” children, “ready” schools, and “ready” communities, focusing where we can on alterable variables such as dyadic relationships, and thereby setting the stage for lifelong success.

The Present Study

As discussed in the previous chapter, very little is known about the promotion of self-regulation development after the transition to school. It is not yet clear whether the existing preschool interventions are feasible, cost-efficient, or effective in an academic-focused kindergarten setting. Because positive dyadic interactions around learning appear to be important in improving self-regulation and academic achievement, more research is needed on enhancing the quality of parent-child relationships, teacher-child relationships, and parent-teacher relationships in kindergarten, especially as these interactions relate to education.

Because kindergarten teachers may be overwhelmed by the demands for increased accountability and high-stakes testing, the present study focuses on primarily on the role of parents in shaping self-regulation and academic skills in kindergarten. Specifically, do parent-child dyadic interactions around learning matter once children transition to school and begin bringing home reading and math assignments? Likewise, how much do parent-teacher dyadic interactions influence children’s self-regulated learning behavior in the classroom as well as growth in literacy skills across the kindergarten year? If these are identified in the present study as important predictors of school success, we will then have identified potential targets for intervention that will lead to improved academic and behavioral outcomes, especially in at-risk populations.

Chapter 3

Methods

Research Questions

The present study aimed to describe ways in which parent involvement (i.e., home learning environment, school-based involvement, and parent-teacher relationship) contributes to spring kindergarten outcomes after accounting for the variance explained by skills at kindergarten entry. The following research questions were addressed:

1. To what extent are three facets of parent involvement related to growth in literacy skills in kindergarten? It is expected that the home learning environment, school-based involvement, and the parent-teacher relationship will be positively related to growth in literacy skills because (a) parents may teach reading skills explicitly in the home learning environment, (b) parents who are active at school may send messages to children that reading is important, and (c) parents who communicate more regularly with teachers may approach reading instruction in the same way.
2. To what extent do three facets of parent involvement contribute to growth in literacy skills in kindergarten indirectly by operating through self-regulated learning behaviors (i.e., attention and persistence) in the classroom? It is expected that the home learning environment, school-based involvement, and parent-teacher relationship will be positively related to growth in literacy skills because (a) parents may reinforce positive behaviors in the home learning environment that are then transferred to the school environment, (b) children may behave more appropriately in the classroom if parents are likely to show up and catch them in the act, and (c) parents and teachers who communicate more frequently may work

together to teach and reinforce positive behavior in the same way. Furthermore, children who display attention and persistence during learning activities in the classroom are then better equipped to benefit from reading instruction, thereby increasing literacy skills.

3. To what extent do three facets of parent involvement contribute to the continued development of self-regulation skills in kindergarten indirectly by operating through self-regulated learning behaviors in the classroom? It is expected that this parent involvement will positively impact growth in self-regulation because children who practice demonstrating attention and persistence in the classroom strengthen their capacity for self-regulation.

Participants

Four elementary schools in a large, consolidated school district were invited to serve as research sites for the present study. Located within a rural county in a Midwestern state, the school district has reported an increase in the number of at-risk students who have registered for school over the last several years. Per the sixth-day enrollment data provided by the school district at the beginning of the 2015-16 school year, 48.2% of students (K-12) qualified for free- or reduced-price meals.

Upon securing written permission from the superintendent, seven kindergarten teachers were asked to sign an agreement letter (see Appendix A) in August to indicate that they were interested in helping with research activities. Six teachers agreed, and their names were entered in a lottery for a gift card to Amazon ($50 in value). One teacher declined to be involved with the study. During parent-teacher conferences in November, teachers described the study to parents and provided them with packets that contained an

informed consent letter (see Appendix B), a demographic questionnaire (see Appendix C), and a parent involvement survey. Teachers agreed to send home packets with kindergarten children whose parents did not attend conferences. Because a low number of packets were returned during the first round of recruitment, teachers were asked in December to send home a second packet with all children who were not already enrolled in the study. Two teachers declined further involvement at this point.

One hundred twenty-five children were attending kindergarten in the district during the period of recruitment. Thirty-seven children returned completed packets and were enrolled in the study (30% response rate). Of these, twenty-three (62%) were male and fourteen (38%) were female. Two children (5%) were identified as English Language Learners because Spanish was reported as the primary language spoken in the home. Four children (11%) were ethnic or racial minorities (i.e., Hispanic/Latino was marked on two questionnaires, and Multiple Races was marked on two questionnaires.). Seven children (19%) had been identified with disabilities and were receiving special education services. Eighteen children (49%) qualified for free- or reduced-price meals based on reported household size and household income.

Measures

Information was obtained through direct assessments of kindergarten children as well as indirect assessments completed by their teachers and parents. All children, regardless of study participation, completed universal screening measures of literacy and self-regulation skills during fall (September) and spring (May) assessment windows. These direct assessments were conducted by five trained school staff members as part of the typical routine in the elementary schools. Teachers rated children's self-regulated

learning behaviors in the winter (November or December). Parents reported demographic information and described their involvement in their children's education in the winter (November or December). These indirect assessments were completed only for children who were enrolled in the study.

Self-regulation skills. The Head-Toes-Knees-Shoulders (HTKS) task is a brief measure of behavioral self-regulation that was developed for use across preschool and early elementary school (McClelland et al., 2007; McClelland et al., 2014; Ponitz et al., 2008; Ponitz, McClelland, Matthews, & Morrison, 2009). The child is given a verbal command (e.g., touch your head) and is instructed to make the opposite response (e.g., touch your toes). The task requires *attention* to the verbal command, *working memory* for the paired rule (i.e., head/toes), and *inhibition* of prepotent responses (i.e., following the command as given). During four practice items, the child receives repeated instructions, praise, and corrective feedback. Ten test items are then completed without feedback. A second paired rule (knees/shoulders) is added to increase task complexity, and the child is given repeated instructions, praise, and corrective feedback on four practice items. The last ten test items are then completed without feedback. A zero is recorded on the scoring protocol for any item on which the child responds incorrectly, a one is recorded for any item on which the child accurately self-corrects, and a two is recorded for any item on which the child responds correctly. Possible scores for the measure range from zero to forty with higher scores reflecting greater behavioral self-regulation skills.

Previous research has demonstrated adequate interrater reliability for the HTKS task (Ivrendi, 2011; McClelland et al., 2007; Ponitz et al., 2008, 2009). Evidence of concurrent validity has been provided with parent ratings of attention shifting and

inhibitory control on the Child Behavior Questionnaire as well as teacher ratings of self-regulation on the Child Behavior Rating Scale, although all correlations were modest (Ponitz et al., 2008, 2009). In addition, children's performance on the HTKS task has been shown to correlate moderately with their performance on other widely-used direct assessments of executive function skills that are thought to tap into attention shifting, working memory, and inhibitory control processes (McClelland et al., 2014).

Literacy skills. The AIMSweb Tests of Early Literacy (TEL) is a set of brief indicators of reading achievement developed for students in kindergarten and first grade (Pearson, 2012). The TEL is used by the school district for two purposes: (a) to screen for reading difficulties three times per year, and (b) to monitor the progress of students who receive targeted or intensive reading interventions in addition to the core curriculum. The TEL consists of four measures: Letter Naming Fluency, Letter Sound Fluency, Phoneme Segmentation Fluency, and Nonsense Word Fluency.

Letter Naming Fluency (LNF) is a measure of alphabetic principle that is given in the fall, winter, and spring. The child is shown a full page containing both uppercase and lowercase letters. The total score is the number of correct letters identified in one minute.

Letter Sound Fluency (LSF) is an indicator of alphabetic principle that is given in the winter and spring. The child is shown a full page containing lowercase letters. The total score is the number of correct letter sounds identified in one minute. For vowels, the short sound should be provided to be scored as correct. The letter "y" is treated as a consonant.

Phoneme Segmentation Fluency (PSF) is a measure of phonemic awareness that is administered in the winter and spring. The child is asked to split an orally-presented

target word into phoneme segments (e.g., /m/, /ŏ/, and /p/ for "mop"). The total score is the number of correct phoneme segments given in one minute.

Nonsense Word Fluency (NWF) is an indicator of both alphabetic principle and phonics that is administered in the winter and spring. The child is asked to sound out a series of nonsense syllables following a c-v-c pattern as if they were real words. The total score is the number of correct letter sounds decoded in one minute. For vowels, the short sound should be provided to be scored as correct. The letter “y” is treated as a consonant.

Strong estimates of test-retest, alternate form, and interrater reliability have been reported for the TEL (Elliott, Lee, and Tollefson, 2001). Evidence of criterion-related validity has been provided with the Woodcock-Johnson Tests of Achievement – Revised and the Test of Phonological Awareness, although correlations ranged from modest to moderate (Elliott et al., 2001). The TEL has been shown to predict reading achievement on the Illinois Standards Achievement Tests in third grade, although correlations ranged from modest to moderate (Pearson, 2012).

Self-regulated learning. The Attention/Persistence Subscale of the Learning Behaviors Scale (LBS; McDermott, Green, Francis, & Stott, 1999) was completed by kindergarten teachers in the winter to provide information about children’s self-regulated learning behaviors in the classroom. Seven items are rated as “most often applies,” “sometimes applies,” and “does not apply.” Sample items include “responds in a manner that shows attention,” “sticks to a task with no more than minor distractions,” and “cooperates sensibly in group activities.” Possible scores range from zero to fourteen, and a higher score indicates that the teacher observes the child engaging more frequently in self-regulated learning behaviors in the classroom. Estimates of internal consistency for

the Attention/Persistence Subscale (APS) have ranged from moderate to strong across studies (McDermott et al., 1999; Worrell, Vandiver, & Watkins, 2001).

Demographic information. In the winter, parents completed a questionnaire (see Appendix C) to provide the following demographic and background information: child date of birth, child place of birth, child ethnicity, primary home language, child preschool experience, daily screen time, child disability status, household mobility, household size, parent education level, and household income.

Parent involvement. Parents completed the Family Involvement Questionnaire (FIQ; Fantuzzo, Tighe, & Childs, 2000) in the winter to provide information on the extent to which they actively support and participate in their child's education. The FIQ consists of 34 items examining the home learning environment (13 items), school-based parent involvement (10 items), and parent-teacher relationship quality (11 items). Sample items include "I spend time working with my child on number skills," "I volunteer in my child's classroom," and "I talk with my child's teacher about classroom rules." Items are rated as "rarely," "sometimes," "often," or "always." Possible scores on the Home Learning Environment Scale (HLES) range from zero to thirty-nine with higher scores reflecting higher quality in the home learning environment. Possible scores on the School-Based Involvement Scale (SBIS) range from zero to thirty with higher scores reflecting greater parent participation in activities at school. Possible scores on the Parent-Teacher Relationship Scale (PTRS) range from zero to thirty-three with higher scores reflecting more frequent communication between parents and teachers.

Acceptable estimates of internal consistency have been reported for each of the three subscales derived from the FIQ (Fantuzzo et al., 2000; Perry, Fantuzzo, & Muniz,

2002). Criterion-related validity has been established with parent volunteer hours recorded by school programs, although correlations were modest (Perry et al., 2002). In addition, ratings of parent involvement on the FIQ have been shown to predict children's receptive vocabulary skills (as measured by the Peabody Picture Vocabulary Test – Third Edition), approaches to learning in the classroom (as measured by the Preschool Learning Behaviors Scale), and problematic behavior in the classroom (as measured by the Conners' Teacher Rating Scale – 28). These correlations ranged from modest to moderate (Perry et al., 2002).

Study Design

The present study used a longitudinal, non-experimental design to examine the degree to which parent involvement predicts literacy and self-regulation skills at the end of kindergarten. The overarching methodology employed was multiple linear regression. The independent variables included all demographic and background information, school readiness skills, teacher-rated self-regulated learning, and three parent-reported facets of parent involvement. The dependent variables were spring literacy skills and spring self-regulation skills.

Independent Variables

Child age. The child's birthdate was used to calculate his or her age upon entry to kindergarten (i.e., on September 1, 2015). On average, children were 5.51 years when they began formal schooling.

Classroom. The kindergarten classroom for each child was dummy-coded to account for any variance due to unmeasured variables such as geographic location, school

climate, school leadership and discipline, classroom management, instructional quality, teacher experience, etc.

Ethnicity. Parents reported on child race or ethnicity. Responses were coded as zero for White/Caucasian (N = 33), one for Hispanic/Latino (N = 2), and two for Multiple Races (N = 2). The two minority groups were combined in further analyses.

Primary home language. Parents indicated the primary language spoken with their child by family members. Responses were coded as zero for English (N = 35) and one for Spanish (N = 2).

Place of birth. All thirty-seven children were born in the same Midwestern state in which the study was conducted; therefore, place of birth was excluded from further analyses due to limited variability.

Daily screen time. Parents reported the amount of time per day their child spends watching television, movies, or playing video games. Responses were coded as zero for 0-59 minutes (N = 13), one for 60-119 minutes (N = 15), and two for 120 minutes or more (N = 9).

Preschool experience. To obtain information regarding child placement during the year prior to kindergarten (i.e., the P-4 year), parents were asked to indicate whether their child was enrolled in a program that was funded and regulated by either the state or federal government (i.e., kindergarten, public preschool program, special education preschool program, or Head Start). Responses were coded as zero for no program (N = 13) and one for a program funded and regulated by the state or federal government (N = 24). Parents were also asked to indicate whether their child was enrolled in such a program for the P-3 year. Responses were coded as zero for no program (N = 19) and one

for a program funded and regulated by the state or federal government (N = 18). Years of preschool experience was calculated from the previous two variables. A child received credit for one year of preschool experience if he or she had been enrolled in a state- or federally-funded program for either the P-4 or P-3 year. In the sample, ten children had zero years of preschool experience, twelve children had one year of preschool experience, and fifteen children had two years of preschool experience prior to kindergarten.

Disability status. Parents reported their child's disability status. Responses were coded as zero for no disability (N = 30) and one for an identified disability (N = 7).

Household mobility. Parents indicated whether their child had experienced a household move within the last year, during the transition to formal schooling. Responses were coded as zero for no moves (N = 28) and one for one or more moves (N = 9). Parents also indicated how many times their child had experienced a household move since he or she was born. Responses were coded as zero for no moves (N = 17), one for one move (N = 9), and two for two or more moves (N = 11).

Household size. Parents were asked to report the first name, age, relationship to the child, and highest level of education completed for each person who was living in the household. As an indicator of household size, responses were coded as zero for four or less people in the home (N = 17) and one for five or more people in the home (N = 20).

Parent education. The highest level of education that had been completed by any individual in the home was coded as zero for some high school, a high school diploma, or the equivalent (N = 15), one for some college, a two-year degree, or a four-year degree (N = 16), and two for an advanced degree (N = 6).

Household income. Parents estimated total household income for the previous year. Responses were coded as zero for $29,999 or less (N = 11), one for $30,000 to $79,999 (N = 13), and two for $80,000 or more (N = 12). One parent did not respond to this question.

Free lunch participation. Eligibility for the school district's free- or reduced-priced meal program was calculated based on household size and household income data reported by parents. Responses were coded as zero for not eligible (N = 18) and one for eligible (N = 18) according to state guidelines. Because one parent did not respond to the income question, eligibility for free- or reduced-price meals is unknown for one child in the study.

School readiness skills. The child's Fall LNF score was used as an indicator of literacy skills at kindergarten entry. The child's Fall HTKS score was used as an indicator of self-regulation skills at kindergarten entry.

Self-regulated learning. The seven items of the Attention/Persistence Subscale of the Learning Behavior Scale were summed to create a composite score, which was used as an assessment of the child's attention and persistence displayed during learning activities in the classroom.

Home learning environment. The thirteen items of the Home Learning Environment Subscale of the Family Involvement Questionnaire were summed to create a composite score. This score served as a measure of the support for learning provided at home (e.g., providing books and print materials, working on math activities together, reviewing homework assignments, etc.).

School-based involvement. The ten items of the School-Based Involvement Subscale of the Family Involvement Questionnaire were summed to create a composite score, which served to measure the amount of parent participation in activities at school (e.g., volunteering in the classroom, attending field trips, etc.).

Parent-teacher relationship. The eleven items of the Parent-Teacher Relationship Subscale of the Family Involvement Questionnaire were summed to create a composite score. This score served to assess the frequency of parent-teacher communication and collaboration (e.g., discussing child behavior with the teacher, attending parent-teacher conferences, discussing child accomplishments with the teacher, etc.).

Dependent Variables

Spring literacy skills. Raw scores for Spring LNF, Spring LSF, Spring PSF, and Spring NWF were converted to z-scores, and these were summed to create a Spring TEL composite score. This score was used as an indicator of reading achievement at the end of kindergarten.

Spring self-regulation skills. The child's Spring HTKS score served as an indicator of self-regulatory competence at the end of kindergarten.

Analytic Plan

Preliminary analyses. Descriptive statistics (means, standard deviations, skewness, and kurtosis) were examined for fall and spring literacy skills, fall and spring self-regulation skills, self-regulated learning, and parent involvement. Estimates of internal consistency were calculated for the Attention/Persistence Subscale as well as the three subscales of the Family Involvement Questionnaire. Between-groups differences in

spring literacy and self-regulation skills by demographic characteristics were explored with one-way analyses of variance and independent samples t-tests. Demographic variables that were significantly related to a dependent variable were included in the regression models.

Multiple linear regression. To examine the extent to which parent involvement predicts spring reading achievement, a multiple linear regression analysis was conducted in three steps. Demographic variables with significant between-groups differences in spring literacy skills were entered in the first model. Fall literacy and fall self-regulatory competence (i.e., school readiness skills) were entered in the second model. The three facets of parent involvement were entered in the third model.

To examine the extent to which parent involvement predicts spring self-regulatory competence, a similar analytic procedure was followed. Demographic variables with significant between-groups differences in spring self-regulation skills were entered in the first model. School readiness skills were entered in the second model. The three factors of parent involvement were entered in the third model.

Chapter 4

Results

The results of the present study are considered provisional for two reasons. First, this study was largely exploratory in nature given the dearth of literature relating parent involvement to the development of literacy and self-regulation skills in kindergarten. The hypothesized paths by which parent involvement may promote growth through self-regulated learning behavior are purely speculative. Second, this study was conducted in a rural area, which is generally not as accessible to researchers due to geographic isolation and reluctance to allow outsiders into the community. Indeed, it was difficult to recruit a sizeable sample given limited administrative and teacher support. Yet, the information presented here is still valuable given recent research indicating that rural children constitute a particularly vulnerable population because they are more likely to live in poverty, to lack access to quality educational and health services, and to have fewer early literacy skills than their non-rural peers at kindergarten entry (Farkas & Hibel, 2008; Grace et al., 2006). As such, the descriptive analyses discussed at the beginning of this section are likely to be more meaningful and generalizable than the inferential analyses discussed at the end of this section. The reader is cautioned against over-interpreting the results of the model testing analyses.

Descriptive Analyses

Table 1 presents the means, standard deviations, skewness, and kurtosis for fall and spring literacy skills, fall and spring self-regulation skills, self-regulated learning behaviors reported in the winter by classroom teachers, and parent involvement activities reported in the winter by parents. On average, children gained letter naming skills over

the course of the year, as indicated by Fall LNF (M = 19.92) and Spring LNF (M = 49.95) scores. These mean scores correspond roughly to the fiftieth percentile compared to AIMSweb national norms. Similarly, children gained self-regulation skills on average, as indicated by Fall HTKS (M = 25.76) and Spring HTKS (M = 33.84) scores. These mean scores are within the range reported by previous studies using the HTKS in the fall or spring of the kindergarten year (Cameron et al., 2012; McClelland et al., 2014; Ponitz et al., 2009). In addition to the descriptive statistics displayed in Table 1, histograms for all of these variables were examined to help identify extreme scores and non-normal distributions. One extreme low score was noted for Spring HTKS. Floor effects were observed for Spring NWF and SBIS scores, and ceiling effects were observed for Spring PSF, Fall HTKS, Spring HTKS, and LBS scores.

Reliability Analyses

Estimates of internal consistency (see Table 2) were examined for measures of self-regulated learning as well as parent involvement. Cronbach's alpha was within the acceptable range ($\alpha > .70$) for all subscales and within the range required for individual evaluations ($\alpha > \sim.90$) for four of the five subscales.

Spring Literacy Measures

Raw scores for Spring LNF, Spring LSF, Spring PSF, and Spring NWF were converted to z-scores, and these were summed to create the Spring TEL composite score. Table 3 presents the bivariate correlations between these measures. Spring PSF was not significantly related to Spring LNF (r = .25, p = .14), and it held a modest relation with Spring NWF (r = .39, p = .02). All other bivariate correlations ranged from moderate to

strong. Thus, the Spring TEL composite score was used as the dependent variable in the multiple regression models that were built to predict spring literacy skills.

Bivariate Correlations

Table 4 presents the bivariate correlations among the following variables: age at kindergarten entry, fall and spring literacy skills, fall and spring self-regulation skills, self-regulated learning, and parent involvement. Age held a modest positive correlation with spring literacy skills ($r = .34$, $p < .05$) and spring self-regulation skills ($r = .35$, $p < .05$); thus, age was included as a predictor variable in the multiple regression models. Fall literacy skills was moderately related to spring literacy skills ($r = .61$, $p < .01$). Fall self-regulation skills was modestly related to spring literacy skills ($r = .37$, $p < .05$) and spring self-regulation skills ($r = .46$, $p < .01$). As such, fall literacy and self-regulation measures were included in the multiple regression models as school readiness variables. Self-regulated learning was modestly correlated with fall literacy skills ($r = .36$, $p < .05$) and fall self-regulation skills ($r = .49$, $p < .01$), but it was not significantly correlated with spring literacy skills or spring self-regulation skills. Therefore, self-regulated learning could not be considered as a mediator between parent involvement and spring literacy or between parent involvement and spring self-regulation. Fall self-regulation skills were negatively correlated with parent-teacher relationships ($r = -.46$, $p < .01$), indicating that children who entered kindergarten with higher self-regulation skills had parents and teachers who communicated with each other less often. None of the parent involvement factors were significantly related to self-regulated learning, spring literacy, or spring self-regulation.

Scatter plots among fall and spring literacy, fall and spring self-regulation, self-regulated learning behaviors, and the three parent involvement variables were examined to determine whether any outlying cases were affecting relations between measures. Two possible cases were identified. One child performed extremely poorly on the assessment of spring self-regulation skills, reflecting an overall decrease in self-regulation skills from fall to spring. This child was identified as an English Language Learner, and she was rated low by her teacher on self-regulated learning behavior. This case may have skewed three observed relations: fall self-regulation skills to spring self-regulation skills, self-regulated learning to spring self-regulation skills, and spring literacy skills to spring self-regulation skills (see Figure 1, Figure 2, and Figure 3). Another child came from a well-educated, low-income household. She was identified as a student with a disability, and she entered kindergarten with very low literacy and self-regulation skills. Her parent reported high levels of parent involvement, especially in activities at school. Her self-regulation skills improved significantly from fall to spring. This case may have skewed two observed relations: fall self-regulation skills to school-based parent involvement and school-based parent involvement to spring self-regulation skills (see Figure 4 and Figure 5). Both of these unique cases could have impacted further analyses conducted in this study; however, they were not excluded from further analyses given the already small sample size.

Between-Groups Differences in Spring Literacy and Spring Self-Regulation

One-way analysis of variance and independent samples t-tests were conducted to explore between-groups differences in spring outcomes by demographic variables. Table 5 presents the results of these analyses. It is important to note that were no significant

differences in outcome variables by classroom, indicating that single-level multiple linear regression analyses are, indeed, appropriate for this data set. Significant between-groups differences in spring literacy skills were found for parent education and free lunch participation (created from household size and income data); thus, these variables were included as predictors in the multiple regression models for spring literacy. Likewise, significant between-groups differences in spring self-regulation were found for ethnicity and primary home language; thus, these variables were included as predictors in the multiple regression models for spring self-regulation.

Relation between Parent Involvement and Spring Literacy

The first research question addressed the relation between parent involvement and spring literacy after controlling for demographic variables and school readiness skills. Three successive and hierarchical models were tested with change in variance accounted for (ΔR^2) as the primary indicator of improvement in relations. The first model examined relations between demographic variables and spring literacy skills. In the second model, fall literacy and fall self-regulation measures were added to account for school readiness skills, and improvements in model fit as well as individual variable contributions were assessed. In the third model, parent involvement measures were added and assessed in a similar fashion. Table 6 presents the results of the multiple linear regression analyses.

Overall fit for the initial omnibus model was significant ($F(3, 32) = 5.825$, $p = .003$) and accounted for over 35% of the variance in spring literacy skills. Child age was the only demographic variable that accounted for unique variance in the first model. The addition of school readiness variables produced a change in R^2 of .102 ($F_{CHANGE}(2,30) = 2.819$, $p = .076$), indicating that fall literacy and self-regulation skills did not explain

significantly more variance in spring literacy skills than the first model had. However, once all demographic and school readiness variables were entered in the second model, fall literacy skills was the only unique predictor of spring literacy skills that remained. The relation between child age and spring literacy became non-significant.

The addition of parent involvement measures produced a change in R^2 of .018 ($F_{CHANGE}(3, 27) = .311$, $p = .817$), indicating that parent involvement did not explain significantly more variance in spring literacy skills than the second model had. Further, none of the demographic, school readiness, and parent involvement variables were unique predictors of spring literacy skills in the third model. The relation between fall literacy and spring literacy became non-significant.

Relation between Parent Involvement and Spring Self-Regulation

The third research question addressed the relation between parent involvement and spring self-regulation skills after controlling for demographic variables and school readiness skills. Table 7 presents the results of the multiple linear regression analyses. A similar analysis plan was followed here, with the first model including demographic information, the second model adding school readiness measures, and the third model adding parent involvement measures.

The initial omnibus model was significant ($F(3, 33) = 7.309$, $p = .001$), accounting for almost 40% of the variance in spring self-regulation scores, with a significant change in R^2 from the first model to the second model. The addition of school readiness variables produced a change in R^2 of .108 ($F_{CHANGE}(2,31) = 3.385$, $p < .047$), indicating that fall literacy and fall self-regulation skills accounted for nearly 11% of additional variance in spring self-regulation. That is, school readiness skills predicted spring self-regulation

after controlling for variance due to age, ethnicity, and primary home language. Once all demographic and school readiness variables were entered in the model, primary home language was the only significant predictor of spring self-regulation skills; however, fall self-regulation skills approached significance.

The addition of parent involvement measures produced a change in R^2 of .049 ($F_{CHANGE}(3, 28) = 1.031$, $p = .394$), indicating that parent involvement did not explain significantly more variance in spring self-regulation than the second model had. Further, once all of the demographic, school readiness, and parent involvement variables were entered in the third model, only primary home language remained a significant predictor.

Testing the Assumptions of Multiple Linear Regression

Homoscedasticity. For each regression analysis, a plot was generated with the standardized predicted value of the outcome on the x-axis and the standardized residual on the y-axis. The residual plot for the model predicting spring literacy skills appeared to be normal with no clear pattern observed among points. Thus, this model likely exhibits homoscedasticity. Yet, the residual plot for the model predicting spring self-regulation skills displayed points that loosely clustered in one area with a few outlying points. Thus, this model likely exhibits heteroscedasticity, or unequal variances, which suggests that a key predictor variable could be missing from the model.

Linearity. For each model, residual plots were examined for evidence of a non-linear relationship between the predictors and outcome variables. No evidence was found for either model; that is, the points did not appear to form a u-shape, indicating that the assumption of linearity was met for these analyses.

Normally distributed errors. For each continuous predictor variable, a Q-Q plot was generated to test for normally distributed errors. For child age, the plot was s-shaped with very few points on the line, suggesting a non-normal distribution. The Q-Q plots for fall and spring self-regulation skills were u-shaped, which is consistent with the negative skews and ceiling effects observed in previous analyses. For fall and spring literacy skills as well as the three parent involvement variables, the Q-Q plots appeared to be normal.

Taken together, these results indicate that the regression model predicting spring literacy is likely to have met the assumptions of homoscedasticity, linearity, and normally distributed errors. However, the regression model predicting spring self-regulation skills is likely to violate the assumptions of homoscedasticity and normally distributed errors. Thus, multiple linear regression may not be the most appropriate method to explore the relation between parent involvement and growth in self-regulation skills in kindergarten.

Chapter 5

Discussion

The present study used a longitudinal, non-experimental design to examine the influence of parent involvement on the development of literacy and self-regulation skills in kindergarten. Thirty-seven children were recruited from six kindergarten classrooms. Direct measures of literacy and self-regulation skills were collected during fall and spring assessment windows. Teachers rated children's self-regulated behaviors displayed during learning activities in the classroom. Parents provided demographic and background data, and they reported on three facets of parent involvement: the home learning environment, school-based involvement, and the parent-teacher relationship.

Descriptive analyses revealed that the mean scores for literacy and self-regulation skills in the fall were within the expected ranges compared to normative samples as well as prior research on the measures (Cameron et al., 2012; McClelland et al., 2014; Pearson, 2012; Ponitz et al., 2009). As such, the children who participated in the present study entered kindergarten with skills that were similar to the population as a whole. In the same way, the mean scores for literacy and self-regulation skills in the spring were also within expected ranges. As such, the children who participated in the present study had skills at the end of kindergarten that were similar to the population as a whole. Moreover, most of the demographic information provided by parents appeared to be evenly distributed, which suggests that this sample was fairly representative of kindergarten children in general with two exceptions. This sample included very few children from ethnic or racial minority backgrounds as well as very few children who are

learning English as a second language. Therefore, the results of this study may not be generalized to those populations.

Descriptive analyses also indicated that most of the measures used in the present study yielded a normal distribution, although an extremely low score was obtained on Spring HTKS. However, floor effects were noted for Spring NWF and SBIS scores. That is, most children scored low on phonetic decoding at the end of kindergarten, and most parents reported low levels of involvement in activities at school. In contrast, a ceiling effect was observed for Spring PSF, indicating that most children scored high on phonemic awareness at the end of kindergarten. Ceiling effects were also noted for Fall HTKS and Spring HTKS, indicating that most children scored high on self-regulation skills at the beginning and end of the year. Finally, a ceiling effect was found for LBS scores, indicating that most children were rated by their teachers as exhibiting high levels of self-regulated learning behaviors in the classroom. Thus, for each of these measures, a restricted range of variability could impact correlations with other constructs.

Despite potentially reduced variability, several significant bivariate correlations were still obtained between measures. Child age at kindergarten entry held a modest, positive association with spring literacy and spring self-regulation, suggesting that older children demonstrated higher skills at the end of the year. Letter knowledge in the fall was moderately and positively correlated with spring literacy, consistent with the extant literature relating preschool literacy skills to later reading achievement (Hart & Risley, 1995; Sénéchal et al., 2001; Storch & Whitehurst, 2002; Whitehurst & Lonigan, 1998). Similarly, self-regulation skills in the fall were modestly associated with both outcome measures, further confirming the importance of self-regulation development prior to

school entry (Allan et al., 2014; Duncan et al., 2007; Stipeck & Valentino, 2015). Moreover, both school readiness measures were modestly and positively correlated with teacher ratings of self-regulated learning in the classroom. This indicates that children who entered kindergarten with higher literacy and self-regulation skills were then rated by their teachers as better able to attend during instruction and persist with difficult tasks. Unexpectedly, though, teacher ratings of self-regulated learning were not related to either kindergarten outcome measure, suggesting that attention and persistence did not contribute to gains in literacy skills or the capacity for self-regulation over the course of the year.

Similarly, none of the three parent involvement measures were correlated with spring literacy or spring self-regulation skills; however, fall self-regulation skills were positively associated with the quality of the parent-teacher relationship. This indicates that children who entered kindergarten with higher self-regulation skills had parents and teachers who communicated less frequently. Thus, it may be that developing a positive parent-teacher relationship is only important for incoming kindergarten children who have poor self-regulation skills. Future research should examine this interaction effect.

The first research question addressed the relation between parent involvement and growth in literacy skills over the course of the school year. Multiple linear regression analyses were conducted to explore the relative contributions of the three facets of parent involvement to spring literacy skills. Results suggested that parent involvement did not uniquely predict growth in literacy skills after controlling for demographic variables and school readiness variables. That is, the bivariate correlations between parent involvement variables and spring literacy skills were non-significant, the change in variance explained

by the model after the parent involvement variables were entered was non-significant, and the t-tests on the standardized coefficients for all three parent involvement variables were non-significant.

These were unexpected findings given substantial prior research linking parent involvement to children's academic achievement (see Castro et al., 2015). It may be that parents over-reported their participation in various activities, thereby reducing the variance captured by the measures; however, this hypothesis seems unlikely given the normal distribution observed for the HLES and PTRS. That is, parents in this study did not report, on average, greater quality in the home learning environment or in the parent-teacher relationship than expected based on prior research with the Family Involvement Questionnaire (Fantuzzo et al., 2000; Perry et al., 2002). As discussed previously, a floor effect was observed for the SBIS, so restricted variability is a possibility for school-based parent involvement. Another possible explanation for these results is that the relationship between parent involvement and spring literacy skills may already be captured by other variables entered in the model. We can be confident that this is not the case for child age or school readiness skills, as these were not correlated with any of the parent involvement measures; however, parent education level or participation in the free lunch program may predict parent involvement.

The second research question addressed the potential of self-regulated learning as a mediator of the relationship between parent involvement and growth in literacy skills. As discussed previously, the bivariate correlation between the LBS and the Spring TEL Composite was not significant. In addition, the LBS did not correlate with any of the parent involvement measures. Thus, self-regulated learning behavior was not included in

the multiple linear regression analyses. These results were not expected given that a prior study showed that self-regulated learning behaviors observed in first grade fully mediated the relation between school-based involvement in first grade and reading achievement in third grade (Daniel et al., 2016). It may be that kindergarten teachers in this study were reluctant to rate children at the lower extreme, which would be consistent with prior research using teacher ratings of child skills (Bassok & Latham, 2017). If this were the case, estimates of self-regulated learning would be inflated in this sample, resulting in a restricted range of variance. Indeed, a ceiling effect was observed for the LBS, indicating that teachers did not rate many children as displaying poor self-regulated learning in the classroom.

The third research question addressed the possibility of self-regulated learning as a mediator of the relationship between parent involvement and growth in self-regulation skills. Yet, the bivariate correlation between self-regulated learning behaviors and spring self-regulation was not significant. Therefore, the LBS was not included in the multiple linear regression analyses. This was an unexpected finding given the number of intervention programs that employ direct training of self-regulation skills (see Diamond & Ling, 2015 for a review). Intuitively, it makes sense that children who can ignore distractions in the classroom and who can persist with difficult tasks until they are complete would then be able to perform well on an isolated assessment of self-regulation skills including attention, working memory, and inhibitory control. It is possible that the HTKS task is not a reliable measure of self-regulation and may, instead, tap into some confounding variable such as gross motor coordination or language comprehension skills (Willoughby et al., 2015). Indeed, it is interesting that the only significant predictor of

spring self-regulation was primary home language, as children who speak mostly Spanish at home performed much worse on the HTKS task than did children who speak mostly English at home.

Results of the multiple linear regression analyses showed that in this sample, parent involvement did not uniquely predict growth in self-regulation skills. That is, the bivariate correlations between the three parent involvement variables and spring self-regulation skills were non-significant, the change in variance explained by the model after parent involvement variables were added was non-significant, and the t-tests on the standardized coefficients for the parent involvement variables were also non-significant. These were not expected findings given accumulating evidence that the quality of the home learning environment as well as parent scaffolding support are related to self-regulation development among preschoolers and that these aspects of parent involvement can be augmented to produce long-term, meaningful outcomes for children (Blair & Raver, 2012b; Chang et al., 2014, 2017; Hammond et al., 2012; Lunkenheimer et al., 2008). Taken together, a conclusion could be drawn that the preschool years may serve as an optimal window during which children's self-regulation development may be promoted through interventions targeting parent support variables. It may be that parent involvement becomes less important after children transition to kindergarten and begin spending much of their day in classrooms. Thus, parent interventions are likely to be more effective in early childhood.

Yet, there was one outlying case that seemed to support the original hypothesis. One child came from a well-educated, low-income family. She was identified as a child with a disability, and she entered school with poor literacy and self-regulation skills. Her

parent reported high levels of parent involvement in education, especially in activities at school. This child made significant growth in self-regulation skills from fall to spring. Thus, it may be the case that for this child, having a parent who was greatly involved in school-based activities helped her to improve attention shifting, working memory, and inhibitory control skills. Therefore, it may still be worthwhile to explore this hypothesis in future research targeting children with delayed school readiness skills.

Strengths and Limitations

Although the results of the present study did not support the original hypotheses, several strengths can still be identified. First, the study followed a longitudinal design to better describe how demographic variables, school readiness, parent involvement, and self-regulated learning behaviors are related to growth in literacy and self-regulation over time. Second, the small sample recruited in this study appeared to be representative of the larger population of kindergarten children. For instance, the percentage of children who participate in the free lunch program in the sample was nearly identical to the percentage of children who participate in the free lunch program in the school district. In addition, in most cases, the mean scores obtained by children on direct assessments were consistent with those reported in normative samples and previous research. Third, the data set was complete for all 37 children with no mobility or attrition over the course of the year. Only household income (and subsequently free lunch participation) was missing for one child in the sample, so procedures for handling missing data were not necessary for this study. Fourth, the measures used in this study were brief, inexpensive, and practical for use in applied research in schools, which is especially important because much of the research on self-regulation development uses physiological measures (e.g., salivary cortisol) or

laboratory tasks (e.g., Stroop test) that are not easily administered in authentic contexts. Finally, the study collected information on several demographic control variables, and relationships between controls and outcomes were robust and consistent with previous studies.

The present study had several limitations. First, the sample size was small, and parents who were more involved in their children's education may be over-represented in the sample. Given that recruitment occurred during parent-teacher conferences, this is a likely possibility because less involved parents were probably also less likely to attend or were less likely to check their child's school bag for questionnaire packets sent home by teachers. Future research could explore alternative ways to recruit participants, such as obtaining parent consent during kindergarten registration.

Second, the small sample size precluded the use of hierarchical linear modeling to examine variance due to classroom-level variables. Although there were no between-groups differences by classroom in spring literacy or spring self-regulation, this could be because there were not many children in each group and the power to detect differences may have been limited. Future research should include larger samples to allow for levels of variance to be examined.

Third, there were floor and ceiling effects observed for several measures, which may have reduced the power of statistical analyses to detect relationships. Future research should incorporate measures that yield a normal distribution when they are administered to kindergarten children. For example, the HTKS task may not be the best indicator of self-regulation development in kindergarten as most children, on average, were able to obtain high scores.

Fourth, children's self-regulated learning behaviors were assessed with a narrow, teacher-rated measure. It may be that teachers in this study were reluctant to rate children poorly out of fear that their classroom management would be judged. Observational measures of children in the classroom during the school day are currently being developed (e.g., Moreno, Shwayder, & Friedman, 2016; Nelson et al., 2017), and the use of these tools in future research may provide a broader and less biased view of children's self-regulated learning.

Finally, the present study relied upon a parent-reported measure of parent involvement. As previously discussed, parents did not appear to endorse items more frequently than expected, but future studies may include more objective measures of parent involvement such as records of volunteer hours at school, teacher ratings of the parent-teacher relationship quality, or observational measures of parent-child dyadic interactions during structured learning tasks.

Conclusion

Within the last fifteen years, many kindergarten classrooms have shifted in focus from social play to academic activities in response to accountability reforms in education (Bassok et al., 2016; Lynch, 2015). Due to these changes, the skills that are necessary for children to be successful in kindergarten have been questioned, with a greater emphasis than ever before on social-emotional and behavioral readiness for school (Bassok & Latham, 2017). At the same time, a body of intervention studies that target behavioral self-regulation skills among preschool children is accumulating, and the evidence that these skills are linked to long-term, meaningful outcomes is increasing (Chang et al., 2014, 2017; Lunkenheimer et al., 2008; Raver et al., 2008, 2009, 2014).

It is interesting to note that in this study, school readiness skills were significantly correlated with self-regulated learning observed in the classroom. That is, children with more letter knowledge and a greater capacity for self-regulation at school entry were rated by their teachers as better able to display attention and persistence during learning tasks. However, self-regulated learning did not correlate with spring literacy skills or spring self-regulation skills. That is, behavioral performance in the classroom did not seem to matter for growth in literacy or self-regulation. It may be that the kindergarten teachers were naturally building in supports for children's behavior, and further intervention is not necessary. More research is needed in this area to explore classroom practices that may be beneficial for children who enter school with poor self-regulation skills.

Given strong evidence that well-managed and emotionally supportive preschool classrooms support children's self-regulation and academic development (Anders et al., 2012; Burchinal et al., 2008; Fuhs et al., 2013; Graziano et al., 2016; Maier et al., 2012; Pakarinen et al. 2011; Ponitz et al., 2009; Raver et al. 2008, 2009, 2014; Rimm-Kaufman et al., 2009), future research should explore these classroom variables in kindergarten. Indeed, Blair and colleagues (2016) showed that executive function in preschool and teacher-child relationship quality in kindergarten each uniquely moderated the relationship between preschool math skills and kindergarten math skills. That is, children made greater gains in math from preschool to kindergarten if they had better cognitive self-regulation and were able to develop positive relationships with their teachers. Thus, for children who enter kindergarten with poor self-regulation skills, the teacher-child relationship may be critical and could be a potential target for intervention.

It is interesting to note that in this sample, children who entered kindergarten with poor self-regulation skills had parents who reported greater quality in the parent-teacher relationship. That is, parents may have communicated more frequently with their child's teacher for support with teaching and reinforcing appropriate behavior. This finding lends support to the idea that parent involvement, especially parent-teacher relationship quality, may only be important for kindergarten children whose self-regulation development is delayed. Thus, efforts to target the parent-teacher relationship for these children may be warranted.

The present study investigated one additional dyadic relationship – parent-child interactions around learning activities in the home environment. However, the HLES was not correlated with school readiness skills, self-regulated learning in the classroom, or spring literacy and self-regulation skills. This is unexpected given increasing evidence that parent scaffolding support for learning during preschool is associated with improved self-regulation skills, self-regulated learning in kindergarten, and peer relationships long-term (Blair & Raver, 2012b; Chang et al., 2014, 2017; Lunkenheimer et al., 2008). Those studies included observational measures of parent-child relationships, which have not yet been used with kindergarten children. Future research should include these measures to determine whether or not parent-child dyadic interactions around learning continue to be important in kindergarten, especially for children with poor self-regulation development. If so, this is a potential target for intervention as well.

Overall, the results of this study did not support the original hypotheses. Instead, the school readiness variables appeared to be the most robust predictors of spring literacy and self-regulation skills. Thus, interventions targeting preschool literacy and behavioral

self-regulation continue to be recommended to improve outcomes for young children. Yet, given that not all children attend preschool programs, these children appear to be at particular risk for school failure. The present study provides some direction for variables to explore and target – teacher-child relationship quality, parent-teacher relationship quality, and parent-child relationship quality – especially for children who enter school with poor school readiness skills. Within these dyadic relationships, it seems most likely that children will grow and learn. Thus, the concepts of "ready" children, "ready" schools, and "ready" communities may be somewhat misleading. These cannot exist in isolation. Instead, researchers, practitioners, and policy makers must examine interplay among children, schools, and communities to identify ways to improve outcomes for all children.

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Table 1

Descriptive Statistics for Child Age, Fall and Spring Literacy, Fall and Spring Self-Regulation, Self-Regulated Learning, and Parent Involvement

Measure	*M*	*SD*	*Skewness*	*Kurtosis*
Child Age	5.51	.33	.05	-1.51
Literacy				
Fall LNF	19.92	14.65	.48	-.85
Spring LNF	49.95	16.21	.13	-.46
Spring LSF	33.84	12.54	.39	-.01
Spring PSF	55.46	12.35	-1.36	3.67
Spring NWF	39.35	20.37	1.33	2.04
Self-Regulation				
Fall HTKS	25.76	11.75	-1.21	.33
Spring HTKS	33.84	6.47	-2.17	6.23
Self-Regulated Learning				
Attention/Persistence	10.81	3.57	-1.11	-.06
Parent Involvement				
Home Learning Environment	30.86	6.34	-.62	-.75
School-Based Involvement	8.97	5.31	1.04	1.50
Parent-Teacher Relationship	14.41	7.12	.18	-.99
Overall Parent Involvement	54.24	15.15	-.11	-1.02

Note. This table presents descriptive statistics for the raw scores of the AIMSweb literacy measures.

Table 2

Estimates of Internal Consistency for Self-Regulated Learning and Parent Involvement

Variable	*N* of Items	α
Self-regulated learning		
Attention/Persistence	7	.88
Parent Involvement		
Home Learning Environment	13	.89
School-Based Involvement	10	.78
Parent-Teacher Relationship	11	.91
Overall Parent Involvement	34	.92

Table 3

Bivariate Correlations between Spring AIMSweb TEL Measures

TEL Measure	1	2	3	4	5
1. Spring LNF	1.00				
2. Spring LSF	.66**	1.00			
3. Spring PSF	.25	.50**	1.00		
4. Spring NWF	.51**	.60**	.39*	1.00	
5. Spring TEL	.77**	.88**	.68**	.78**	1.00

Note. *$p < .05$. **$p < .01$. Raw scores for Spring LNF, Spring LSF, Spring PSF, and Spring NWF were converted to z-scores, and these were summed to create the Spring TEL composite score.

Table 4

Bivariate Correlations between Child Age, Fall and Spring Literacy, Fall and Spring Self-Regulation, Self-Regulated Learning, and Parent Involvement

Variable	1	2	3	4	5	6	7	8	9
1. Child Age	1.00								
2. Fall LNF	.44**	1.00							
3. Spring TEL	.34*	.61**	1.00						
4. Fall HTKS	.61**	.61**	.37*	1.00					
5. Spring HTKS	.34*	.30	.25	.46**	1.00				
6. APS	.32	.36*	-.05	.49**	.32	1.00			
7. HLES	.17	.05	.11	.09	.12	-.05	1.00		
8. SBIS	.02	.08	.09	-.16	-.10	.05	.30	1.00	
9. PTRS	-.14	-.27	-.09	-.46**	-.23	-.25	.53**	.57**	1.00

Note. *$p < .05$. **$p < .01$. Raw scores for Fall LNF were converted to z-scores. Spring TEL is a composite score created by summing the z-scores for Spring LNF, Spring LSF, Spring PSF, and Spring NWF. APS = Attention/Persistence Subscale. HLES = Home Learning Environment Subscale. SBIS = School-Based Involvement Subscale. PTRS = Parent-Teacher Relationship Subscale.

Table 5

Between-Groups Differences in Spring Literacy and Spring Self-Regulation by Demographic Variables

Analysis of Variance

	Spring Literacy		Spring Self-Regulation	
Demographic Variable	*F*	*p*	*F*	*p*
Classroom	.67	.65	2.35	.06
Daily Screen Time	1.48	.24	2.80	.08
Years of Preschool	.38	.67	.10	.91
Moves in Child Lifetime	1.96	.16	.81	.45
Parent Education	4.08	.03	.86	.43
Household Income	1.96	.16	.68	.52

Independent Samples Test

	Spring Literacy		Spring Self-Regulation	
Demographic Variable	*t*	*p*	*t*	*p*
Gender	.18	.86	.25	.81
Ethnicity	-.15	.88	10.97	.00
Primary Home Language	.55	.58	3.96[a]	.00[a]
P-4 Preschool	.26	.80	1.18	.28
P-3 Preschool	1.10	.28	.26	.61
Early Intervention	-.52	.61	-1.29	.20
Disability Status	.11	.91	-.14	.89
Moves in Last Year	1.73	.09	-.03	.98
Household Size	1.28	.21	1.89	.07
Free Lunch Participation	2.52	.02	1.12	.27

[a] Equal variances are not assumed.

Table 6

Multiple Linear Regression Models for Spring Literacy Skills

	R^2	ΔR^2	*B*	*SE B*	β
Model 1: Demographics	.353	--			
Child Age			3.27	1.45	.33*
Parent Education			1.12	.70	.26
Free Lunch Participation			-1.85	.99	-.30
Model 2: School Readiness	.456	.102			
Child Age			1.18	1.80	.12
Parent Education			1.02	.67	.23
Free Lunch Participation			-.74	1.05	-.12
Fall LNF			1.34	.64	.43*
Fall HTKS			.00	.05	.00
Model 3: Parent Involvement	.474	.018			
Child Age			.99	1.88	.10
Parent Education			1.04	.71	.24
Free Lunch Participation			-1.01	1.16	-.16
Fall LNF			1.32	.69	.42
Fall HTKS			.01	.06	.04
Home Learning Environment			.04	.10	.09
School-Based Involvement			-.04	.11	-.07
Parent-Teacher Relationship			.05	.11	.10

Note. *$p < .05$. The dependent variable is Spring TEL, a composite score created by summing the z-scores for Spring LNF, Spring LSF, Spring PSF, and Spring NWF. Raw scores for Fall LNF were converted to z-scores.

Table 7

Multiple Linear Regression Models for Spring Self-Regulation Skills

	R^2	ΔR^2	*B*	*SE B*	β
Model 1: Demographics	.399	--			
Child Age			5.32	2.72	.27†
Ethnicity			3.03	3.85	.15
Primary Home Language			-17.66	5.32	-.63**
Model 2: School Readiness	.507	.108*			
Child Age			.12	3.24	.01
Child Ethnicity			4.23	3.68	.21
Primary Home Language			-18.79	5.04	-.67**
Fall LNF			.55	1.05	.08
Fall HTKS			.20	.10	.36†
Model 3: Parent Involvement	.556	.049			
Child Age			-.06	3.28	-.00
Ethnicity			5.33	4.11	.26
Primary Home Language			-20.61	5.31	-.73**
Fall LNF			.58	1.08	.09
Fall HTKS			.12	.12	.21
Home Learning Environment			.28	.17	.27
School-Based Involvement			.05	.21	.04
Parent-Teacher Relationship			-.28	.21	-.31

Note. †$p < .06$. *$p < .05$. **$p < .01$. ***$p < .001$. Raw scores for Fall LNF were converted to z-scores.

Figure 1

Scatterplot of Fall Self-Regulation by Spring Self-Regulation

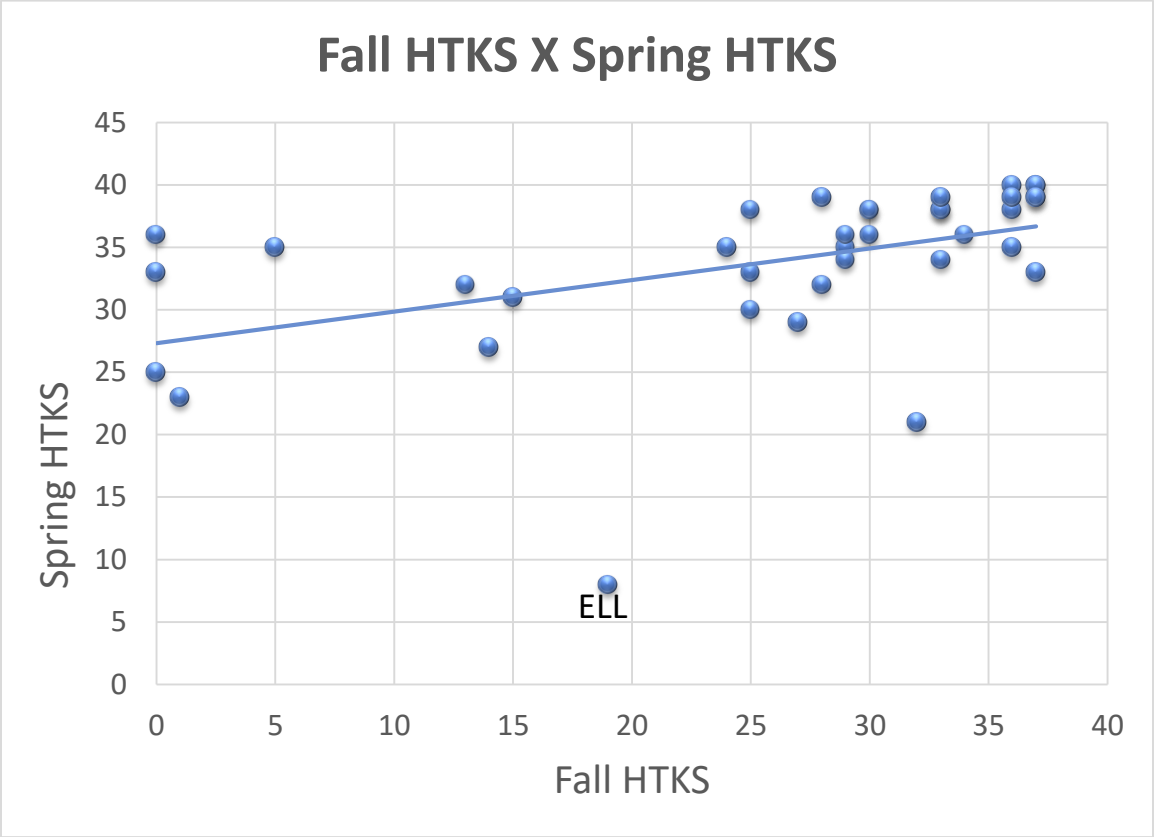


Figure 2

Scatterplot of Self-Regulated Learning by Spring Self-Regulation

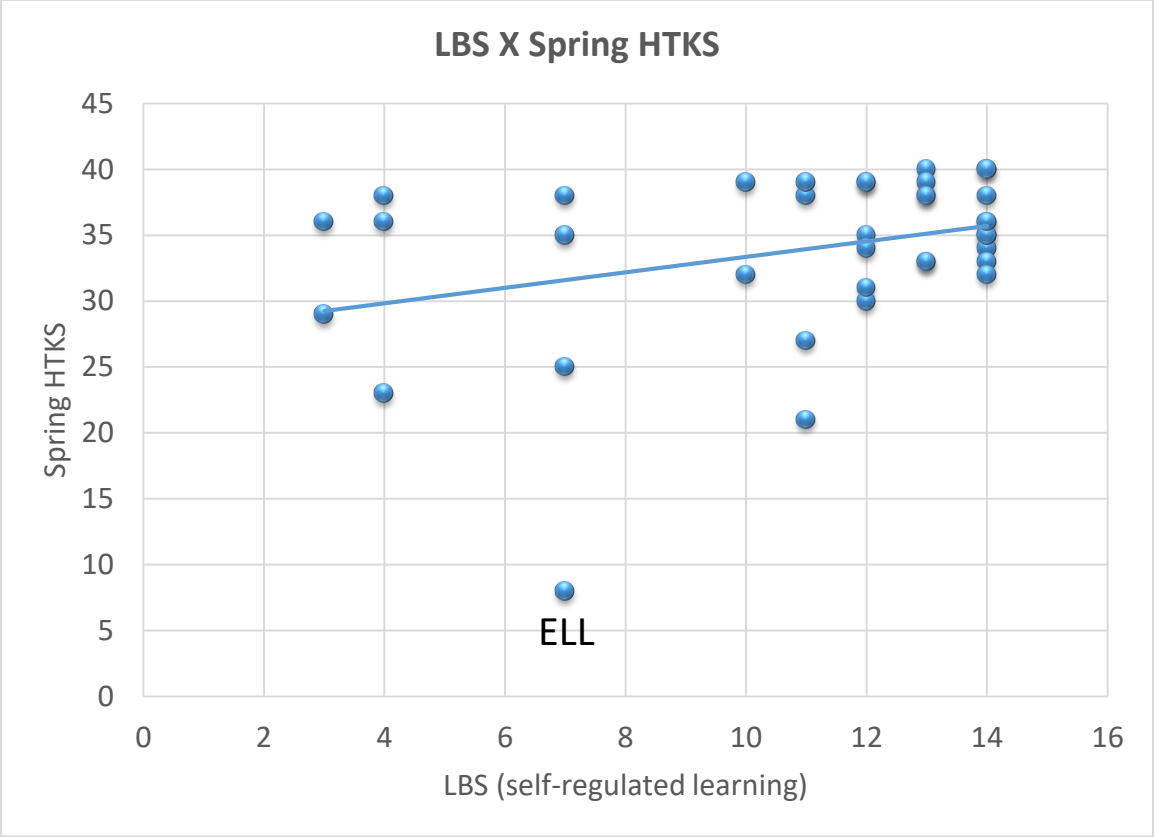


Figure 3

Scatterplot of Spring Literacy by Spring Self-Regulation

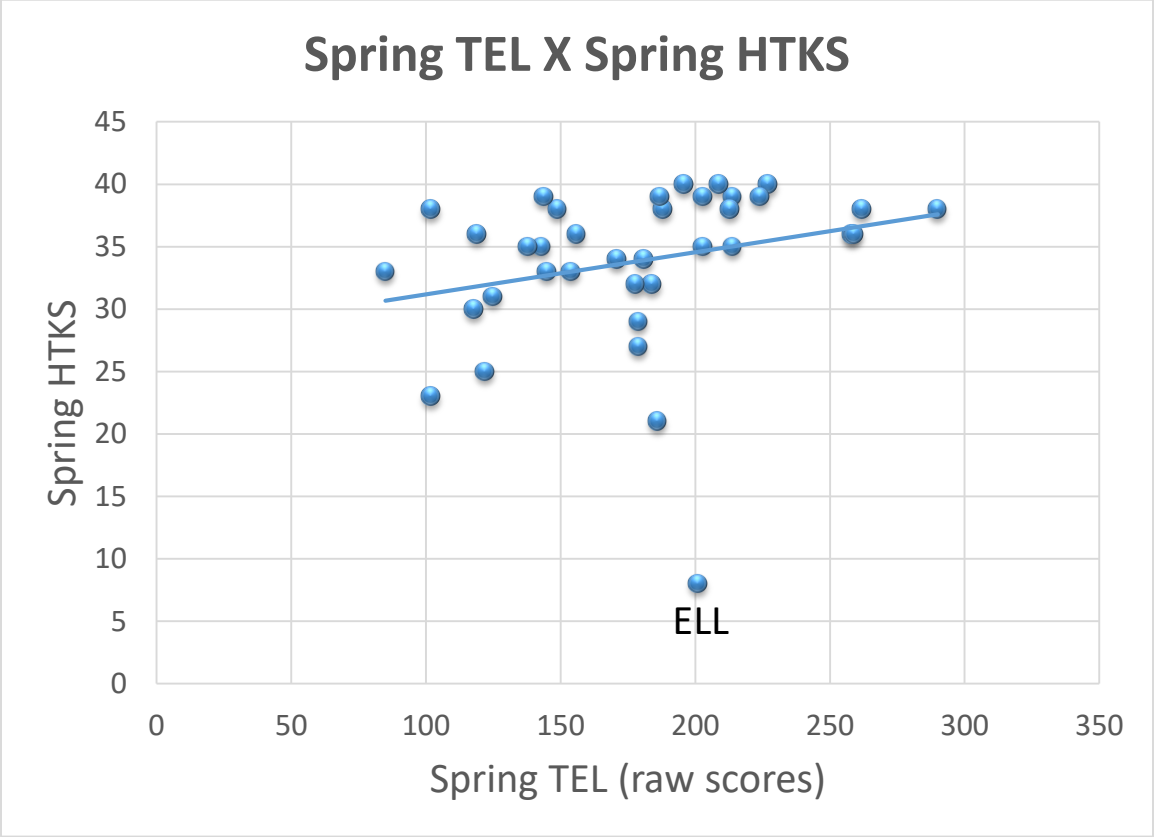


Figure 4

Scatterplot of Fall Self-Regulation by School-Based Parent Involvement

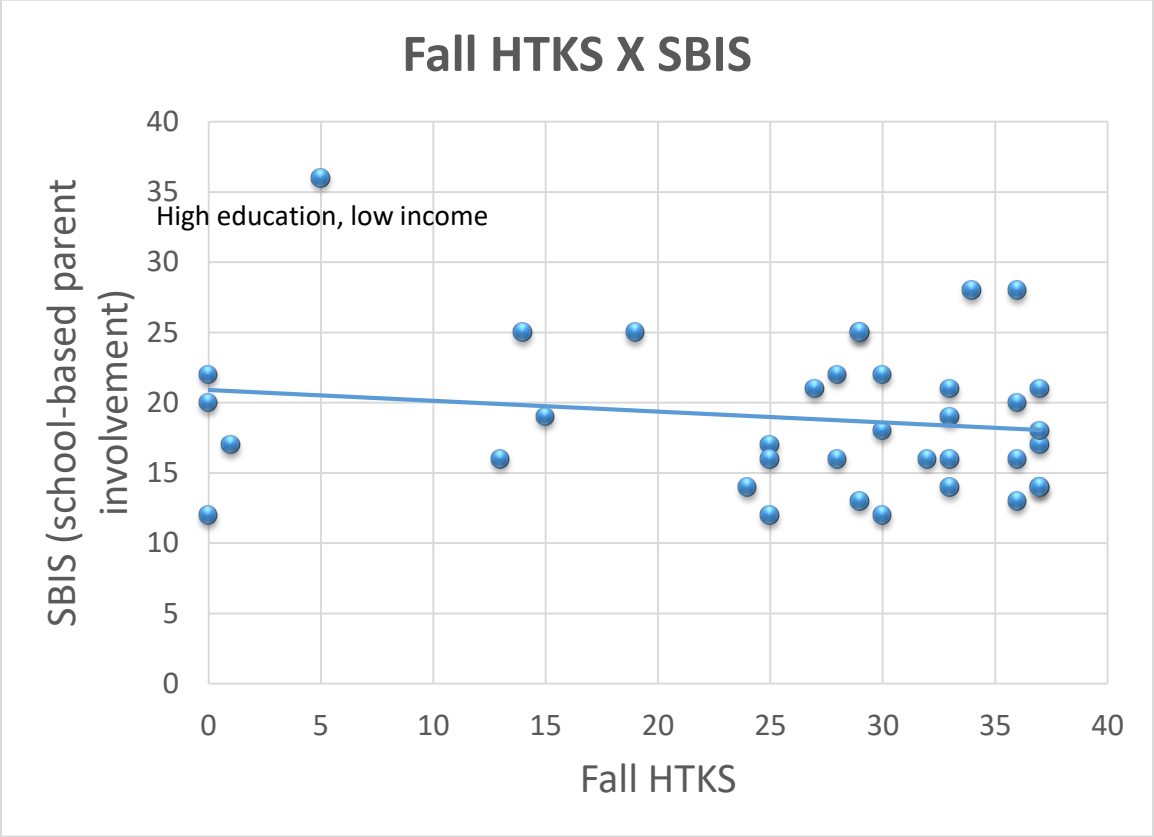
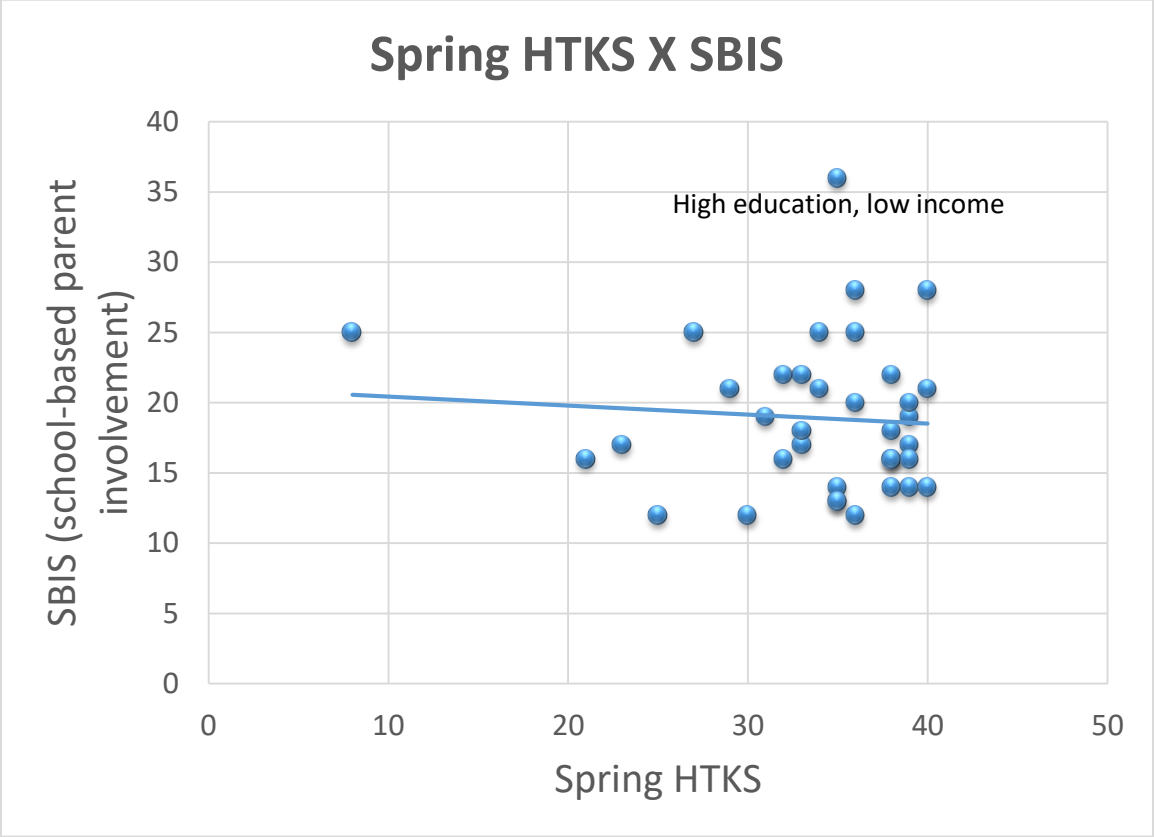


Figure 5

Scatterplot of Spring Self-Regulation by School-Based Parent Involvement



Appendix A

TEACHER AGREEMENT LETTER

You are invited to help with a research study of the impact of parent involvement on the educational performance of kindergarten students. You were selected to help with this study because you are a kindergarten teacher at Prairie Central CUSD #8. Please read this letter and ask any questions you may have before agreeing to help with this study.

This study is being conducted by Ms. Amber Hays, under the supervision of Dr. Scott McConnell. Ms. Hays and Dr. McConnell are affiliated with the Department of Educational Psychology at the University of Minnesota. Although Ms. Hays also works for Prairie Central CUSD #8, the school district is not conducting this study.

Background Information

The purpose of this study is to evaluate the impact of parent involvement in learning activities on the development of reading and behavioral skills during kindergarten. If the results of this study indicate that specific components of parent involvement are related to growth over the course of the year, we will have identified one way to effectively improve the educational performance of kindergarten students.

Procedures

If you agree to help with this study, you will be asked to:

- Describe the study to parents of children in your classroom during parent/teacher conferences in October;
- Distribute parent consent forms and parent questionnaire packets in a manner that ensures confidentiality; and
- Complete a 7-item questionnaire on classroom learning behaviors for each child with signed consent to participate in the study.

Potential Risks

There are no anticipated risks for you to help with this study.

Potential Benefits

There are no direct benefits associated with helping Ms. Hays conduct this study, but the results may be used to improve the educational outcomes of future kindergarten students.

Compensation

If you agree to help with this study, you will be entered in a drawing for a $50 gift card to your choice of Amazon or Starbucks after parent/teacher conferences in October.

Confidentiality

The records of this study will be kept private. In any sort of report that may be published, no information will be included that would make it possible to identify a participant. Research records will be stored securely and only Ms. Hays will have access to the records.

Voluntary Nature of the Study

Your help with this study is voluntary. Your decision whether or not to help will not affect your current or future relationships with the University of Minnesota or with Prairie Central CUSD #8. If you decide to help, you are free to withdraw at any time without affecting those relationships.

Contacts and Questions

The researcher conducting this study is Ms. Hays, under the supervision of Dr. McConnell. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact Ms. Hays by phone (815-945-2971) or by email (ahays@prairiecentral.org).

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

Please keep this form for your records.

Appendix B

PARENT CONSENT FORM

Your child is invited to participate in a research study of the impact of parent involvement on the educational performance of kindergarten students. Your child was selected as a possible participant because he/she is enrolled in kindergarten at Prairie Central CUSD #8. Please read this form and ask any questions you may have before agreeing to allow your child to be in this study.

This study is being conducted by Ms. Amber Hays under the supervision of Dr. Scott McConnell. Ms. Hays and Dr. McConnell are affiliated with the Department of Educational Psychology at the University of Minnesota. Although Ms. Hays also works for Prairie Central CUSD #8, the school district is not conducting this study.

Background Information

The purpose of this study is to evaluate the impact of parent involvement in learning activities on the development of reading, math, and behavioral skills during kindergarten. If the results of this study indicate that specific components of parent involvement are related to growth over the course of the year, we will have identified one way to effectively improve the educational performance of kindergarten students.

Procedures:

If you allow your child to be in this study, you will be asked to:

- Complete a questionnaire to provide background information about your child;
- Complete a questionnaire to provide information on your involvement in learning activities at home and at school;
- Allow your child's teacher to complete a questionnaire on your child's classroom learning behaviors; and
- Allow Ms. Hays to access your child's scores on reading and behavioral assessments that are typically collected with all kindergarten students at Prairie Central CUSD #8.

Risks and Benefits of Participating in the Study

There is one possible risk associated with enrolling your child in this study:

- You may feel uncomfortable providing responses to some of the questionnaire items. First, **you are encouraged** to skip any questions you do not want to answer. In addition, **you are encouraged** to return questionnaires to your child's teacher in the sealed envelope that was provided to you.

There are no direct benefits associated with enrolling your child in this study, but the results may be used to improve the educational outcomes of future kindergarten students.

Compensation

Your name will be entered into a drawing for a $50 WalMart gift card when you return a completed questionnaire packet.

Confidentiality

The records of this study will be kept private. In any sort of report that may be published, no information will be included that would make it possible to identify your child. Research records will be stored securely and only Ms. Hays will have access to the records.

Voluntary Nature of the Study

Participation in this study is voluntary. Your decision whether or not to allow your child to participate will not affect your current or future relationships with the University of Minnesota or with Prairie Central CUSD #8. If you decide to allow your child to participate, you are free to withdraw consent at any time without affecting those relationships.

Contacts and Questions:

The researcher conducting this study is Ms. Hays, under the supervision of Dr. McConnell. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact Ms. Hays by phone (815-945-2971) or by email (ahays@prairiecentral.org).

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

Please keep this form for your records. If you would like for you and your child to participate in this study, sign and return the following page to your child's teacher.

Appendix C

Demographic Questionnaire

You are receiving this questionnaire packet because your child is involved in a research study of kindergarten students, and you signed a form agreeing to provide some information. This will take approximately 20 minutes to complete. You will be asked to return the completed packet to your child's teacher in the enclosed envelope. When we receive your packet, you will be entered into a lottery for a chance to win a $50 WalMart gift card.

1. First name: _____ Last name: _____

2. What is your relationship to the child listed at the top of this page? _____

3. What is the address where we can send your gift card? _____

4. How would you describe your child's racial or ethnic group?
   - ☐ Black/African-American, non-Hispanic
   - ☐ White/Caucasian, non-Hispanic
   - ☐ Asian
   - ☐ Pacific Islander/Native Hawaiian
   - ☐ Alaska Native/American Indian
   - ☐ Hispanic/Latino
   - ☐ Other *(Specify: _____)*
   - ☐ Multiple races/ethnic groups *(Specify:_____)*

5. What language do family members use to speak with your child most often?
   - ☐ English
   - ☐ Spanish
   - ☐ Other *(Specify: _____)*
   - ☐ English and Spanish equally
   - ☐ English and other specified language equally *(Specify: _____)*

6. Where was your child born?
   - ☐ Illinois
   - ☐ Other U.S. state *(Specify: _____)*
   - ☐ Outside the U.S. *(Specify: _____)*

7. On a typical day, about how many hours does your child spend watching television, movies, or playing video games? _____ hours

8. Was your child enrolled in any of the following programs last school year (2014-2015) when he/she was approximately 4-5 years?
    - □ Kindergarten *(□ Chenoa □ Westview □ Meadowbrook □ Chatsworth □ Other)*
    - □ Public preschool program *(□ Chenoa □ Westview □ Chatsworth □ Other)*
    - □ Early Childhood Special Education (ECE) *(□ Chenoa □ Westview □ Chatsworth □ Other)*
    - □ Head Start
    - □ Private preschool program (such as His Kids, Thawville Nursery School, etc.)
    - □ Licensed daycare (center or in-home)
    - □ Unlicensed daycare/child was in the care of a family member, friend, or neighbor
    - □ None of the above/child was at home with a parent or guardian

9. Was your child enrolled in any of the following programs the year before (2013-2014) when he/she was approximately 3-4 years?
    - □ Public preschool program *(□ Chenoa □ Westview □ Chatsworth □ Other)*
    - □ Early Childhood Special Education (ECE) *(□ Chenoa □ Westview □ Chatsworth □ Other)*
    - □ Head Start
    - □ Private preschool program (such as His Kids, Thawville Nursery School, etc.)
    - □ Licensed daycare (center or in-home)
    - □ Unlicensed daycare/child was in the care of a family member, friend, or neighbor
    - □ None of the above/child was at home with a parent or guardian

10. Did your child receive any of the following birth-to-three services?
    - □ Early Head Start
    - □ Early Intervention (developmental therapy, physical therapy, speech therapy)
    - □ No birth-to-three services

11. Does your child have an Individualized Education Program (IEP)?
    - □ Yes *(Specificy disability: □ Developmental Delay □ Speech/Language)*
    - □ No

12. How many times has your child moved in the past 12 months? _____ times

13. How many times has your child moved since he/she was born? _____ times

Please complete the following information for EACH person living in your household:

Name	Age	Relationship to Child	Highest Level of Education Completed

14. Which of the following best describes your total household income for the year 2014?

- ☐ $14,999 or less
- ☐ $15,000 to $19,999
- ☐ $20,000 to $29,999
- ☐ $30,000 to $39,999
- ☐ $40,000 to $49,999
- ☐ $50,000 to $59,999
- ☐ $60,000 to $69,999
- ☐ $70,000 to $79,000
- ☐ $80,000 to $89,999
- ☐ $90,000 to $99,999
- ☐ $100,000 or more

Thank you very much for your responses.